THE PAPER INDUSTRY
and PAPER WORLD
AN EDUCATIONAL NEWS MAGAZINE — OCTOBER, 1938

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Patterson

PRESENTS A NEW CONICAL TYPE STOCK CHEST AGITATOR

FOR VERTICAL AND HORIZONTAL CHESTS

For Instantaneous Mixing of Pulps Up To and Including 6½% Bone Dry Basis

Regardless of size of tank, this Agitator will completely turn over the entire batch of any stock up to 6½% consistency in 50 seconds . . . and, because of the peculiar mixing action generated, the stock is thoroughly mixed when one turnover is finished. Three turnovers, or three minutes' time, insures perfect distribution.

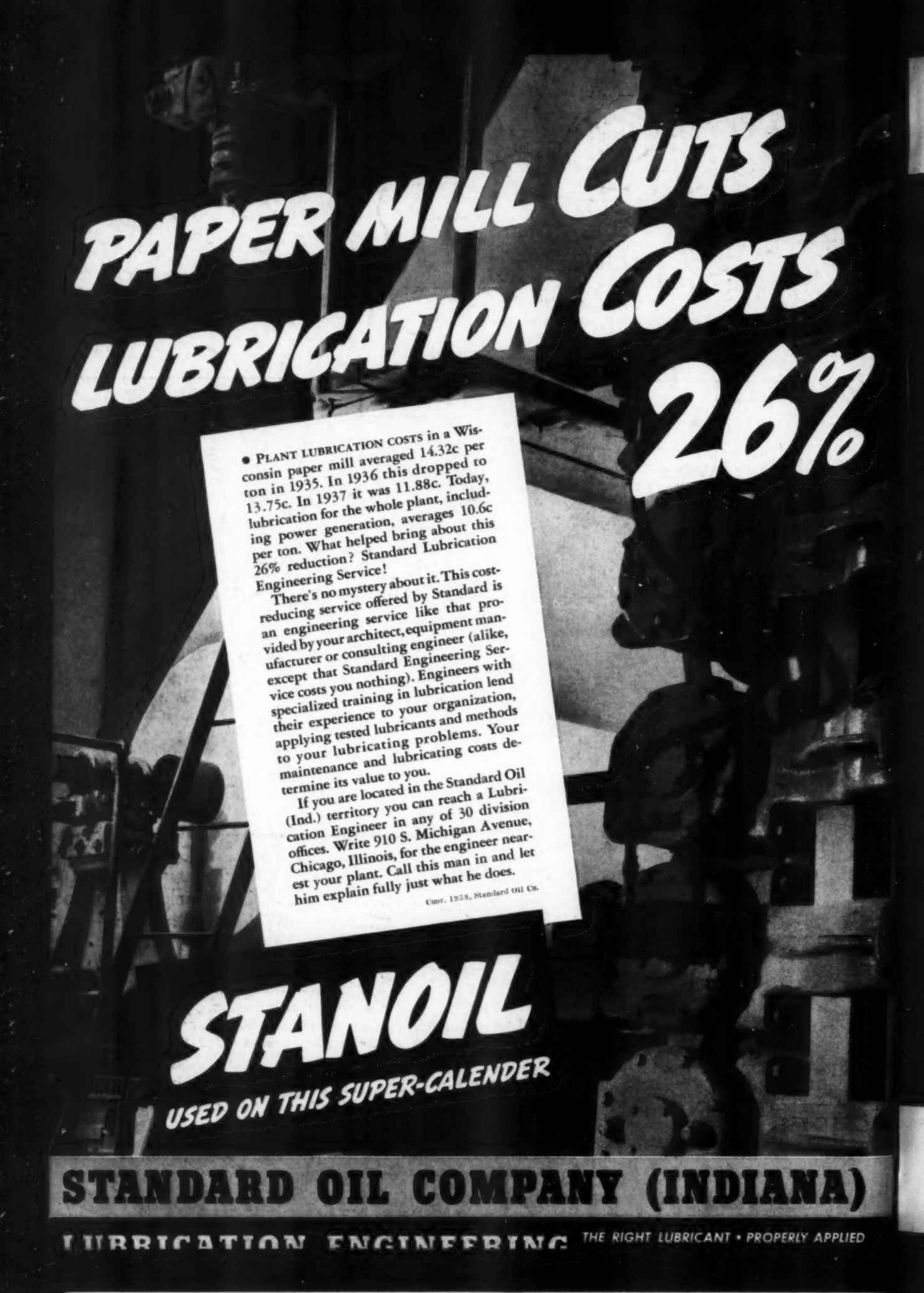
Ideal for any stock problem . . . perfect for coloring, bleaching or normalizing machine chest consistencies.

Investigate this new Patterson achievement . . . it is reasonable in first cost and economical in operation.

Richard L. Cameron
President

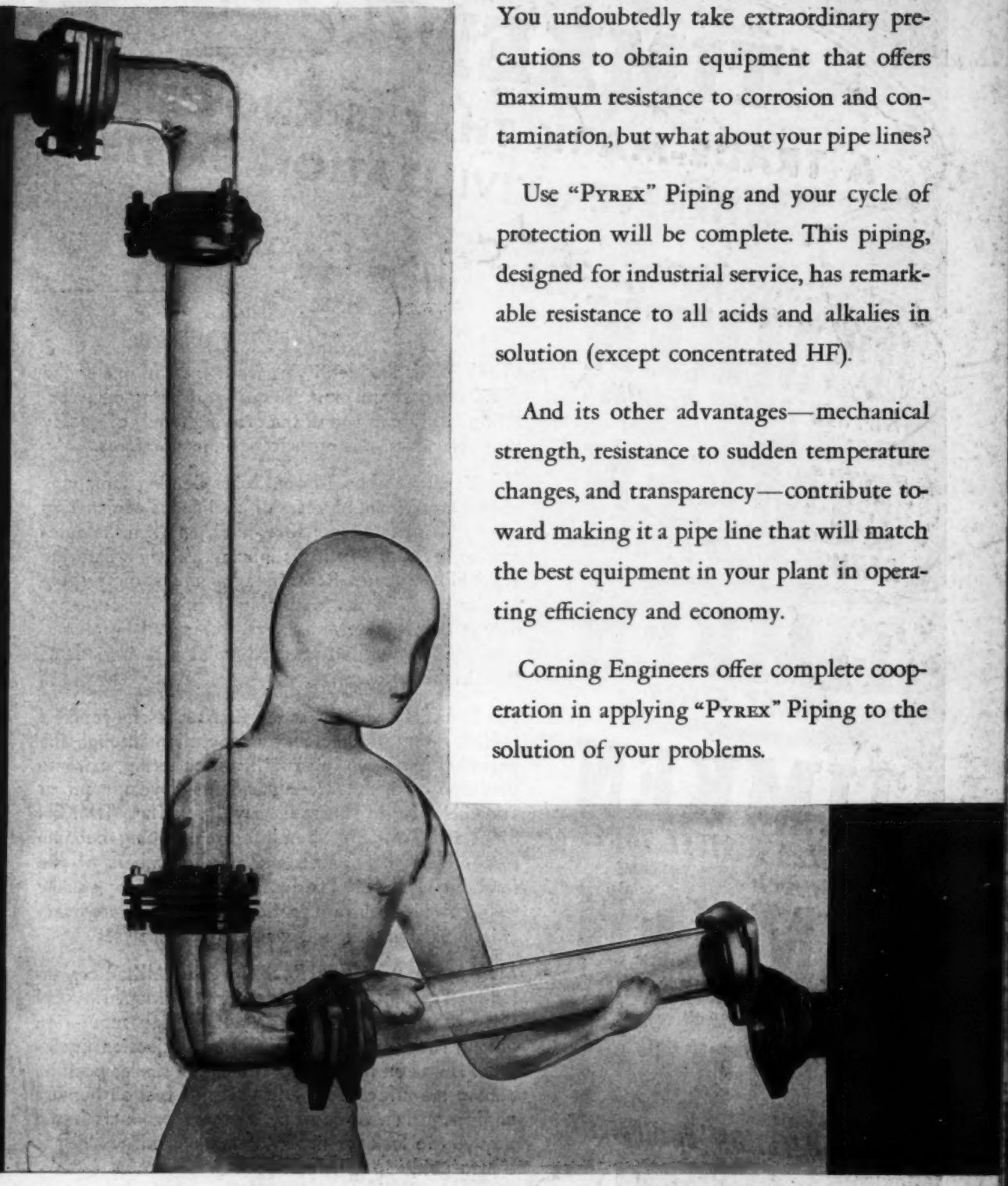
THE PATTERSON FOUNDRY & MACHINE CO.

EAST LIVERPOOL, OHIO, U. S. A.


PAPER MILL CUTS LUBRICATION COSTS 26%
• PLANT LUBRICATION COSTS in a Wisconsin paper mill averaged 14.32c per ton in 1935. In 1936 this dropped to 13.75c. In 1937 it was 11.88c. Today, lubrication for the whole plant, including power generation, averages 10.6c per ton. What helped bring about this 26% reduction? Standard Lubrication Engineering Service!
There's no mystery about it. This cost-reducing service offered by Standard is an engineering service like that provided by your architect, equipment manufacturer or consulting engineer (alike, except that Standard Engineering Service costs you nothing). Engineers with specialized training in lubrication lend their experience to your organization, applying tested lubricants and methods to your lubricating problems. Your maintenance and lubricating costs determine its value to you.
If you are located in the Standard Oil (Ind.) territory you can reach a Lubrication Engineer in any of 30 division offices. Write 910 S. Michigan Avenue, Chicago, Illinois, for the engineer nearest your plant. Call this man in and let him explain fully just what he does.
Copr. 1938, Standard Oil Co.
STANOIL
USED ON THIS SUPER-CALENDER
STANDARD OIL COMPANY (INDIANA)
LUBRICATION ENGINEERING
THE RIGHT LUBRICANT • PROPERLY APPLIED

EAST LIVERPOOL, OHIO, U. S. A.

THE *connecting link* OF PROTECTION



You undoubtedly take extraordinary precautions to obtain equipment that offers maximum resistance to corrosion and contamination, but what about your pipe lines?

Use "PYREX" Piping and your cycle of protection will be complete. This piping, designed for industrial service, has remarkable resistance to all acids and alkalies in solution (except concentrated HF).

And its other advantages—mechanical strength, resistance to sudden temperature changes, and transparency—contribute toward making it a pipe line that will match the best equipment in your plant in operating efficiency and economy.

Corning Engineers offer complete cooperation in applying "PYREX" Piping to the solution of your problems.

PYREX

TM. REG. PYREX U.S. PAT. OFF.

CORNING GLASS WORKS

CORNING N. Y.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works

GLASS REVEALS BOTH ITS MAKE-UP AND ITS CONTENTS

"TIMKEN"

TRADE-MARK REG. U. S. PAT. OFF.

A TRADE-MARK THAT IS KNOWN WHEREVER CIVILIZATION EXISTS

TIMKEN
TAPERED ROLLER BEARINGS

TIMKEN
RAILWAY ROLLER BEARINGS

TIMKEN
ALLOY STEELS

TIMKEN
SEAMLESS STEEL TUBES

TIMKEN
ROCK BITS

TIMKEN
FUEL INJECTION EQUIPMENT

"TIMKEN" is the identifying trade-mark of one of the world's largest and most famous engineering-manufacturing institutions and of the growing family of quality products which this organization manufactures.

The history of The Timken Roller Bearing Company covers more than 40 years of continuous engineering development and experience. It began when the automotive industry was in its infancy. At that time the TIMKEN Tapered Roller Bearing started its spectacular climb to the leadership it enjoys today—not only in automobiles and motor trucks, but in railroad cars, locomotives, streamlined trains and all kinds of industrial equipment.

The TIMKEN Bearing was the first successful tapered roller bearing. Its increasing reputation through the years has been due to scientific engineering, extreme precision of manufacturing and the development of TIMKEN Electric Furnace Alloy Steel. Thus, TIMKEN Steel and TIMKEN Seamless Steel Tubing became respectively the second and third members of the family of TIMKEN Products. They are now equally well-known in their own particular fields, and are available in all standard, and many special analyses.

More recently TIMKEN Rock Bits and TIMKEN Fuel Injection Equipment were added to the group. TIMKEN Bits already have gained an outstanding reputation among rock bit users. TIMKEN Fuel Injection Equipment is well on the way to attaining a similar position among manufacturers and users of fuel oil burning engines. When buying any of these products it will pay you to look for the trade-mark "TIMKEN". It is a sure guide to satisfaction.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

LONG YEARS *in these Corliss Engines*

You can lubricate your worm gear drives (designed for both lubrication) with Texaco Steam Cylinder Oil of the same grade used in your steam engines.
Steam joints on the paper machine may be perfectly lubricated by the same Texaco Steam Cylinder Oil you use in your engines. No special oil needed.

Paper mills getting top performance using fewer lubricants

Your engines will neither waste lubricating oil, nor groan from lack of lubrication, if you will put them on one of the many grades of Texaco Steam Cylinder Oils selected by our Lubrication Engineers.

Pulp and paper mills everywhere find that these quality oils, not only assure full power output at all times, but they reduce time-out for inspection and repairs. This is because they atomize quickly and completely, form on all working parts an unbroken film that resists the washing action of condensation.

Moreover, you can also lubricate other equipment with Texaco Steam Cylinder Oil, making the one oil answer several other purposes.

If you are not getting practically trouble-free performance of your reciprocating steam engines, switch to Texaco. Our lubrication engineers are always ready to help you make a sound selection, and 2186 warehouses assure prompt delivery.

The Texas Company, 135 East 42nd Street, New York City.

40-PAGE BOOKLET *points out efficient lubricaion in pulp and paper mills . . . from beginning to end. Interesting, instructive . . . Your copy is waiting.*

TEXACO *Steam Cylinder Oils*

VALVES *be Seated!*

TO good-natured Charlie Elstrodt, every chlorine cylinder valve is leaky until his own "personal" test proves it is tight. Because of Charlie's hard-boiled philosophy, because of the sureness of the compressed air test, mighty few leaky valve seats have gotten by Charlie's inspection in his sixteen years at Mathieson's Niagara Falls plant.

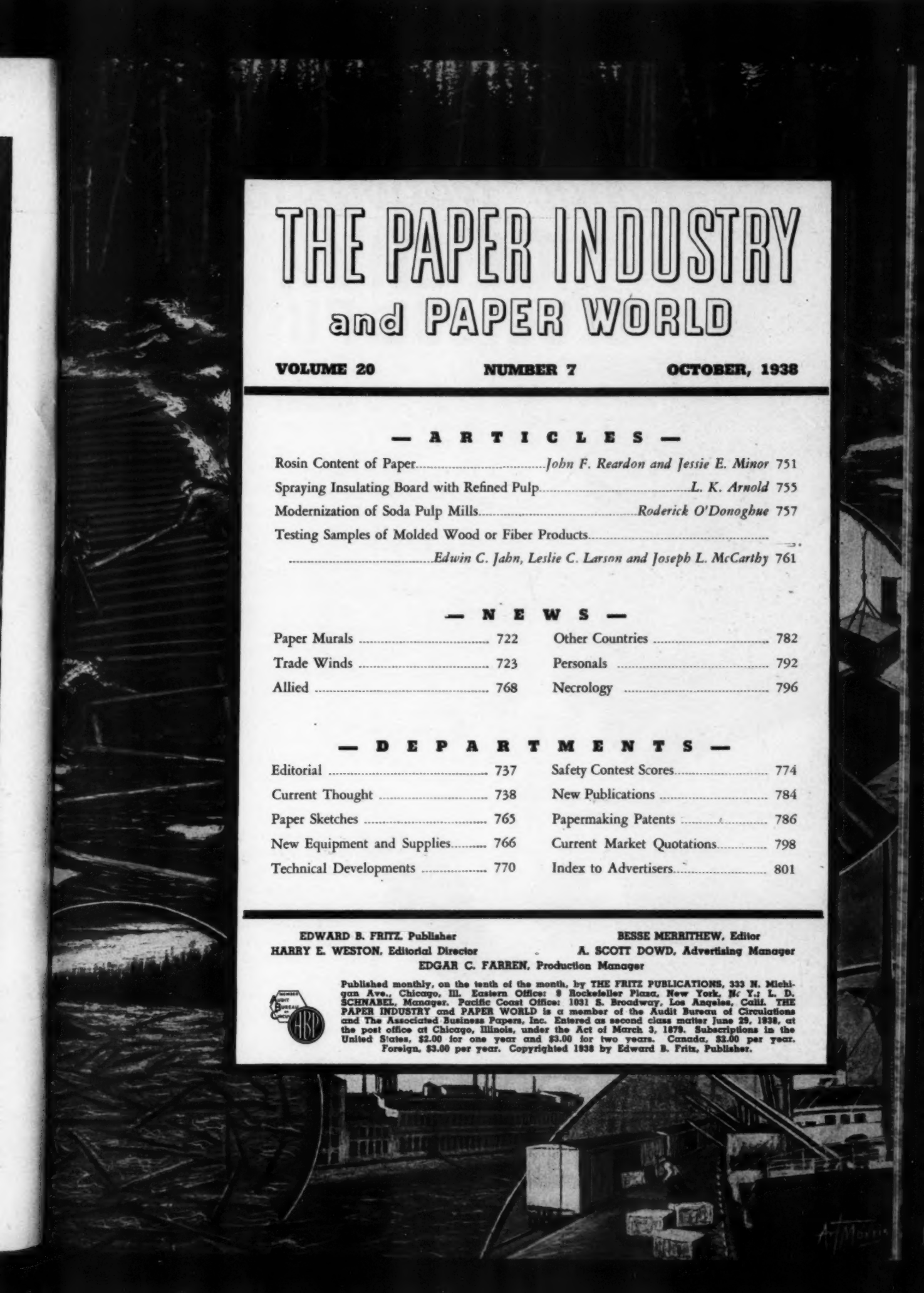
Charlie's job is one of about nineteen different steps in the cleaning, reconditioning and inspection routine through which Mathieson Chlorine cylinders and valves must pass before they are shipped. And in each of these operations it is men like Charlie Elstrodt, men who keep their eyes "glued on the ball", who give Mathieson's cylinder routine the backbone which makes it valuable to you.

Mathieson engineers produce chlorine of a purity second to none; and Mathieson workmen see that you get this pure product in clean, smooth-functioning containers. Couple with this Mathieson's unusual traffic and delivery facilities and their expert technical service and you see why this company presents a chlorine team that is hard to beat.

The MATHIESON ALKALI WORKS (Inc.)
60 East 42nd Street New York, N. Y.

MATHIESON CHEMICALS

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER
HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) . . . SULPHUR CHLORIDE
CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE) . . . ANALYTICAL SODIUM CHLORITE



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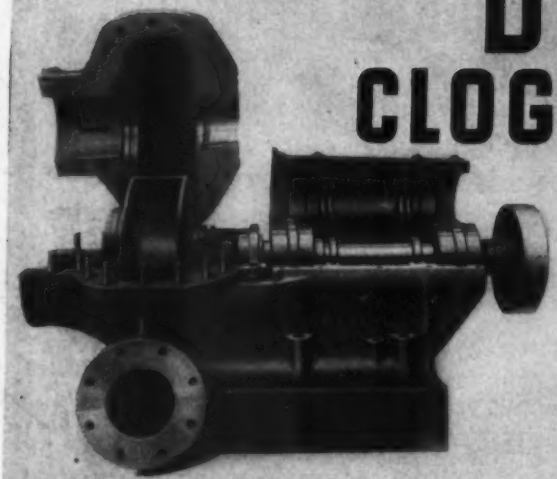
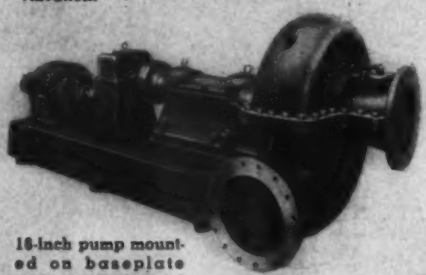
Superior Features of DE LAVAL CLOGLESS PUMPS



Clogless pump with enclosed impeller; casing cover and bearing cover lifted to show accessibility of impeller and wearing rings, also large size ball bearings, spaced well apart to prevent vibration.



16-inch pump mounted on baseplate with standard speed motor and helical speed reducing gear. The outer coupling on the motor shaft is for attachment to a standby gasoline engine.

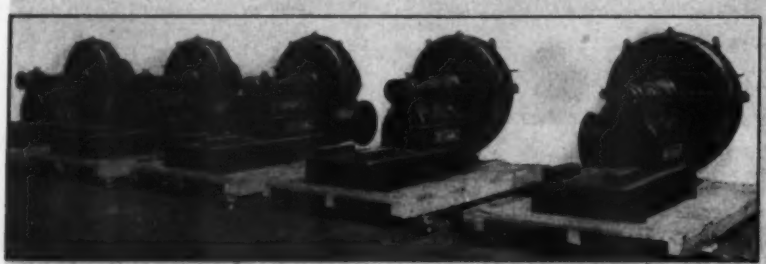
1 The casing is split in the plane of the shaft so that the pump can be disassembled without disturbing piping. The inlet is also accessible through a large handhole.

2 The single-inlet, overhung impeller has wide passages without sharp corners where fibrous materials could accumulate, but, at the same time, provides guidance for the water to obtain high efficiency and to avoid cavitation.

3 Wearing rings protect both impeller and casing at the joint separating the suction from the discharge space, to reduce leakage and to make it possible to restore the original efficiency at little cost. The rings can be sealed with clear water to keep out grit.

4 To reduce overhang, the stuffing box is located over the hub of the impeller, which is protected by a renewable sleeve. A clear water seal can be used to protect the packing.

5 The heavy shaft is carried in ball bearings spaced well apart and supported by a bearing pedestal cast integrally with the pump casing.



Five of a shipment of seven Clogless pumps, six of which are designed to deliver 10,400 g.p.m. each against 15 ft. at 294 r.p.m., and one to deliver 7000 g.p.m. against 27 ft. at 547 r.p.m.

Upon receipt of data concerning the character of the liquid to be pumped and the head and capacity requirements, our Engineering Department will submit recommendations and estimates.

Ask for a copy of the paper on *SEWAGE PUMPS* read before the American Society of Mechanical Engineers by A. Peterson, Chief Engineer of the De Laval Pump Department.

3302

DE LAVAL *Steam Turbine Co.*
TRENTON, N. J.

MANUFACTURERS OF STEAM TURBINES, PUMPS—CENTRIFUGAL, PROPELLER, ROTARY DISPLACEMENT, CENTRIFUGAL BLOWERS AND COMPRESSORS, WORM GEARS, HELICAL GEARS, HYDRAULIC TURBINES AND FLEXIBLE COUPLINGS • • • SOLE LICENSEE OF THE BAUER WACH EXHAUST TURBINE SYSTEM

Each Buell Fly Ash Collector is engineered for the individual installation. Each is designed to produce at the lowest cost the results that the special circumstances demand. Each is guaranteed to *give* those results—and *does*.

Where no unusual requirements are to be met, Buell's Standard Guarantee comes automatically into effect. It is always lived up to, often exceeded. It is *one* indication of the unusually high efficiency of the Van Tongeren system throughout the nuisance range.

For a clear, concise, yet thorough presentation of fly ash correction, ask for a copy of the new *Booklet A80*. It will interest both managing and engineering executives.

BUELL ENGINEERING COMPANY INC
SUITE 5000, 6 CEDAR STREET, NEW YORK
SALES OFFICES IN PRINCIPAL CITIES

buell
DUST COLLECTORS

BECAUSE ALL MOVING PARTS DEPEND ON SKF BEARINGS, THIS PAPER MACHINE

STAYS YOUNG

SKF-EQUIPPED

BUILT BY BAGLEY & SEWALL CO.

To prolong the life of a costly machine, moving parts must function properly — particularly the bearings.

Bagley & Sewall realized that when they used SKF Bearings on wire, press, and dryer felt rolls, suction press rolls, dryer cylinders — *all* moving parts — on this 210" paper machine.

The records of this machine at the Crossett Paper Mills is typical of the performance that SKF Bearings are making on chippers, screens, Jordans, beaters — paper machinery of every kind. When the manufacturer of a machine selects SKF Bearings, you can depend upon it, EVERYONE profits.

SKF INDUSTRIES, INC.
Front St. & Erie Ave. Phila., Pa.

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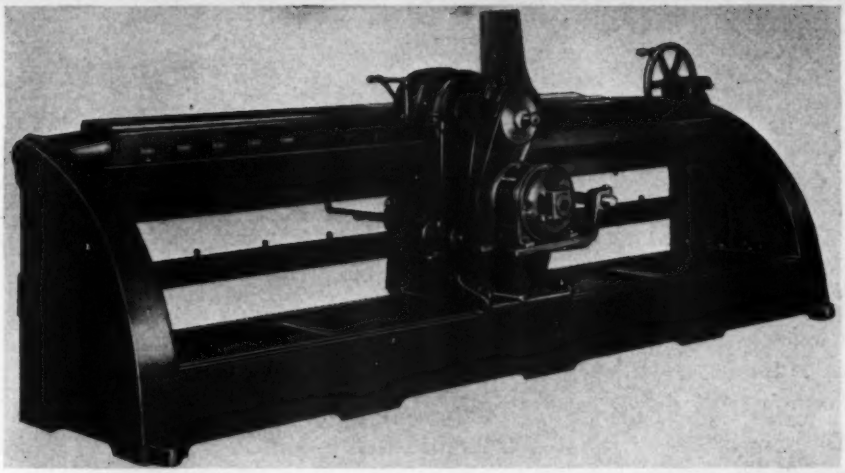
SKF makes more types and sizes of ball and roller bearings than any other manufacturer in the world.

THE KEY TO *Accurate Cutting*— *. . Knives Precision Ground on a Seybold*



Any job of precision cutting or trimming must have the support of a keen, accurately ground knife. It is the knife edge that contacts material to be cut. It must be sharp, straight edged and properly beveled.

Insure high cutting quality in your knife by grinding it on a Seybold Precision Knife Grinder. This self contained, fully automatic unit takes little floor space in your plant and does not require an expert to operate.

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In the Forefront of TECHNOLOGICAL PROGRESS

Photo by courtesy The Clopay Corporation

FEW INDUSTRIES have contributed so much to the general distribution of comfort, beauty and utility among the masses of our people as has the paper industry. Even the shades that grace the windows in millions of American homes are, at base, nothing more or less than high grade paper. So inexpensive is the basic material that the price paid by the consumer for the finished article is but a small fraction of the price usually charged for window shades of other types.

But the cost and the quality of paper are conditioned largely upon the speed and uniformity with which the excess water is extracted from the web. And because paper manufacturers for eighty years have found that Hamilton Felts do this work better, at higher speeds, on longer runs, with fewer stops and at lower cost, Hamilton Felts are now standard equipment on the paper machines that set the pace of technological progress.

• *From the thinnest tissue to the heaviest boards there is a Hamilton Felt that will do your work better, faster and at lower cost.* •

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills, Established 1858 •

Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

Hamilton Felts

BLACK CLAWSON
and
SHARTLE BROS.

LIKE A SNOWBALL ROLLING DOWN HILL . . . your first purchase of Black-Clawson-Shartle paper mill machinery is never your last. So impressed will you be with your new B-C-S equipment that you will immediately want future purchases to bear the same nameplate. • This has been the experience of many mills . . . it will be yours.

MIAMI AGI-FLO PUMPS
Thorough chest agitation. No stratifying. Delivery to machine head box in absolutely uniform volume . . . all with one motor and on far less power.

The Black-Clawson Co. and Shartle Brothers Machine Co.

POWELL IRON BODY VALVES

Records show Powell Iron Body Valves endure far beyond specifications. Their rugged construction and workmanship have long been recognized by plant engineers who demand unusual valve performance.

FIG. 1499
SCREWED END "MASTER PILOT"
GATE VALVE

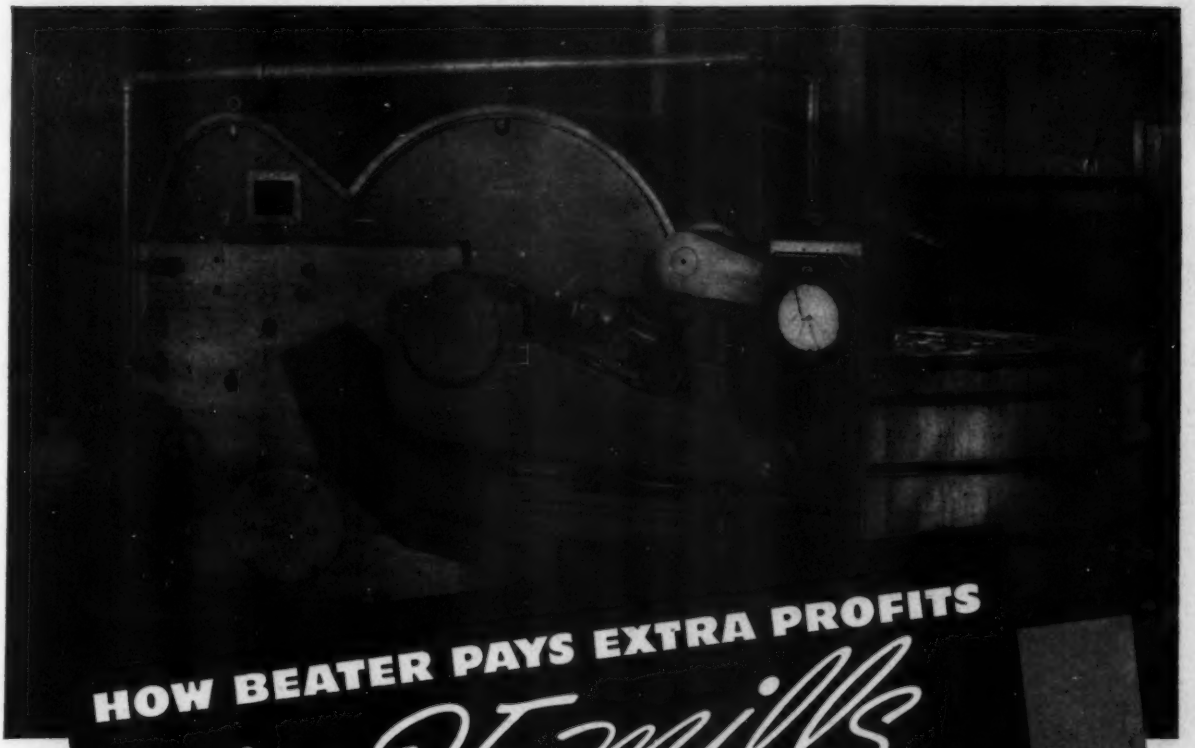
FIG. 1444
FLANGED END "MODEL STAR"
GATE VALVE

FIG. 241
FLANGED END "MODEL STAR"
GLOBE VALVE

For complete information on Powell Iron Body Valves refer to the Powell new No. 11 Catalog.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

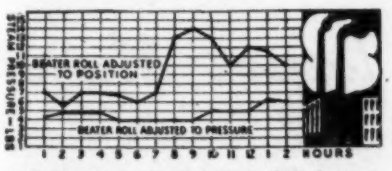


HOW BEATER PAYS EXTRA PROFITS *in 25 mills*

You can get dividends out of the beating process by measuring and controlling roll pressure with the Taylor Beater Roll Pressure Recorder

UNTIL four years ago there was no sure way to measure and control one most important variable in the treatment of stock. The beater-man determined beater roll pressure by a roll-position recorder, by listening to a sounding rod held against the bed plate, or by manual adjustment of a hand wheel.

Today, the Taylor Beater Roll Pressure Recorder removes guesswork. It enables the operator to adjust the roll to the correct pressure for any stock being treated. It eliminates variations of 300% or more in roll pressure. It helps to produce more uniform stock—at lower cost—in a shorter space of time.



● Results of several weeks' tests in a high class specialty mill to determine variations in beating time. Save time and you save money.

During the past four years, 25 mills have used this Taylor Pressure Recorder to obtain more efficient beating, raise the quality of their product, increase production and cut conversion costs. Several

5.5% SAVING→
1109 KWH CONSUMED WHEN POSITION RECORDER ONLY WAS USED
1048 KWH CONSUMED WHEN Taylor BEATER ROLL PRESSURE RECORDER USED

● Power savings effected by using a Taylor Beater Roll Pressure Recorder and eliminating too high roll pressure help to pay for it in a short time.

weeks' tests in one mill showed an increase of 4.8% in beating capacity without the cost of more beating equipment. In other mills savings in time went as high as 12%.

Tests also show Taylor Beater Roll Pressure Recorders can help to cause a substantial saving in power. When used to maintain proper roll pressure, a reduction of 5½% resulted in power consumption.

More uniform drying, greatly improved folding and more efficiency in duplicating any beating schedule—all these advantages are worth money. Power and time savings alone pay for a Taylor Recorder in a short time.

Let Taylor Engineers bring you this accuracy and economy, assure you of consistent high quality in finished paper. Get the full story of the Taylor Beater Roll Pressure Recorder. Ask a Taylor Representative for Special Bulletin 98113. Or write Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada. Manufacturers in Great Britain—Short & Mason, Ltd., London, England.

Taylor

Indicating · Recording · Controlling

TEMPERATURE, PRESSURE, FLOW *and* **LEVEL INSTRUMENTS**

See page 728

Paper Murals

TRADE WINDS

Proposed Canalization Would Open Huge Timberland

A PROPOSED plan for canalization of the beautiful Umpqua River in Douglas County, Oregon, from Scottsburg to Roseburg, a distance of ninety-five miles, would open to the paper and pulp and lumber industries the largest single stand of softwood timber in the United States.

Douglas County, in Southern Oregon, comprises the whole of the Umpqua River watershed which has nestled away possibly the largest stands of timber in that section of the state. Five per cent of all the timber in the nation is in this region. It embraces twenty-five per cent of the nation's Douglas Fir.

At a hearing before the United States Board of Army Engineers this summer, under supervision of Major S. L. Damon, of Portland, the necessities of canalization of the Umpqua were stressed. Landlocked, despite a river, to the extent of freight rates, at the present time the mammoth stand of timber is practically at a standstill with freight rates too excessive for industrial development.

Of this total reserve of timber, conservatively figured at 70,081 billion board feet, 45,418 billion board feet are publicly owned and the balance, 24,663 billion board feet, is privately owned.

Development of the Umpqua, as proposed at the hearing, would embrace construction of a canal of a depth of nine feet and a width of 200 feet and a width of 300 feet on the turns; construction of a series of locks and dams between Scottsburg and Roseburg which would operate for the fourfold purpose of navigation, irrigation, power, and flood control. Under the set-up, the timberlands would be operated on a sustained yield basis supplying seventy billion

View of the North Umpqua River above CCC Camp, near the end of the present road.

Left—Stand of young growth Shasta Fir (in background) along south branch of the Umpqua. Right—Typical stand of Douglas Fir.
(All photographs courtesy U. S. Forest Service.)

Winter snow scene at the Forest Service Station at Tiller, Oregon.

board feet, or over, of softwood timber for industrial consumption each year. Forest surveys recently made and reported to the board of U. S. Army Engineers reveal that the stands of timber in the Umpqua watershed are particularly adapted to sustained yield management. This report is based on the fact that the type and age of the timber in the district varies in the correct proportion but sustained yield hinges on the canalization of the river or the timber will shortly reach a stagnation point.

Local interests pushing the project propose that a complete survey be made by the Army engineers to determine the feasibility of constructing the project. A long string of reports rests in the files telling of the attempts that have been made at furthering navigation work on the Umpqua. At one time in the past century the project was approved by Congress and work was started near Scottsburg. The project fell through at that time. Since then several surveys and projects have been approved.

Should the present survey and effort result in favorable congressional action, the pulp and paper industry would be faced with the possibility of an equal footing with the large lumber concerns and already established pulp and paper manufacturers in the Pacific Northwest in acquiring holdings in this mammoth timber reserve.

At the present time, navigation companies are operating between Port of Umpqua at Reedsport, Oregon, and Scottsburg, a distance of 28 miles. These companies operate barges and tugs between these points which comprises the distance of tidewater. Howard Hinsdale, manager of the Umpqua Navigation Company, which operates over the tidewater reaches of the Umpqua at the present time, es-

The Forest Service and CCC are constructing a mountain-side road to Diamond Lake. This road runs along the North Umpqua River.

timates that transportation charges for timber products between Roseburg and Port of Umpqua at Reedsport would be fifty cents per one thousand feet as compared with a present rail rate of five dollars and twenty-eight cents per one thousand feet between the two points.

Conservative estimates by those associated with efforts to improve the Umpqua for navigation for some time are that the project would run between thirty and thirty-five million dollars. The chief factor and hope of those interested in the development, for accomplishment of the project, rests in the fact that the United States Government would be the chief benefactor in completion of the project. This benefit of the government lies in the fact that the huge reserve of timber would be opened and the reduced freight rate would raise the value of the timber to exceed the cost of construction of the project. This coupled with the fact that the timber reserve is at the present time unsalable because of lack of water transportation, has the sponsors optimistic and confident that after a detailed survey has been made, favorable congressional action will be taken on the proposal.

Proponents of the Umpqua navigation proposal visualize a great industrial migration to the Umpqua watershed by pulp and paper and lumber industries within the next decade. Their vision reveals great industrial activity in the timber reserves under a sustained yield management making for perpetual activity and they see a wonderful recreational area tied in with this industrial movement where the many families associated with this activity may relax in the splendor of one of nature's most wonderful regions.

◆

MONTREAL NOW HOME OF INT'L PAPER SALES CO.

The management and general offices of the International Paper Sales Company, Inc., will hereafter be at Montreal. This move is in line with steps to consolidate all departments operating International's newsprint properties and activities. Present sales offices will be continued at New York, Chicago, Boston, Pittsburgh, and Atlanta.

The officers of International Paper Sales, Inc., are as follows: J. H. Hinman, president; E. L. Crooker, vice-president; R. C. Doane, vice-president and general manager; W. N. Hurlbut, vice-president; F. A. Laird, treasurer. Mr. Hurlbut will remain in New York.

PAPER MILLS DAMAGED BY NEW ENGLAND HURRICANE

THE recent hurricane catastrophe in the East caused severe damage to the many paper mills and to stocks of paper in merchant warehouses, located in the six states which underwent the blow. The full loss has not yet been made public, but insurance companies have given an approximation of $500,000,000 for the entire area for property of all kinds.

Aside from the tidal water which submerged part of Providence, New London, and New Bedford, flooding warehouses there, the paper industry's loss came almost entirely from the floods in the Merrimac and Connecticut rivers and tributaries from those streams. In northern Maine damage was slight, but paper plants in the rest of New England, barring four mills near Boston, had to close for the balance of the week following the September 21st disaster. Among plants that were hard hit were the Erving Paper Mills, Erving, Mass.; Collins Manufacturing Co., North Wilbraham, Mass.; Westfield River Paper Company, Russell, Mass.; Strathmore Paper Company, Woronoco, Mass., and the L. L. Brown Paper Company, at Adams, Mass.

Paper mills in Holyoke, Mass., suffered extensive property damage. The hurricane swept the city for two hours on September 21st and climaxed several days of heavy rain that caused the Connecticut River to rise within less than two feet of the all-time high record of 16 feet in the flood of March 1936. The river reached a peak of 14 feet, nine inches, inundating several of the mills along the river bank.

All of the divisions of the American Writing Paper Corporation, Holyoke, were forced to suspend operations. The Valley Paper Company, the Chemical Paper Company, the Newton Paper Company and the Morart Paper Co. were among the chief sufferers.

The hurricane, the first in New England history, blew roofs off of mills, and broke wires bearing electric power. It lasted for two hours and reached a velocity of 75 miles per hour. Most of the damage caused by the flood was in cellars where motors were submerged and boilers extinguished.

All three New England railroads to the Hudson were down for a week and by September 28, only the New York, New Haven and Hartford Railroad had opened one circuitous route. Movement of paper and raw materials over the roads was impeded by the fallen trees for several days but first trucks reached Boston from Holyoke on September 24. Broken power lines were a contributing factor to the time lost in the Connecticut Valley, Vermont and New Hampshire.

EASTERN CO. STOCKHOLDERS SUBMIT PLAN

A committee of common stockholders of the Eastern Manufacturing Company, Bangor, Maine, recently proposed a reorganization plan to the Federal Court at Bangor. The plan provides a new board of directors, but stockholders are known to favor the continuance of Edward Graham as president.

According to the plan, new capital would come from the General Investment Company, which owns the largest single group of stock, and which would have the right to subscribe to stock not taken in the new company by other present stockholders. The investment company would also be given $50,000 warrants to buy new common stock at $5 per share within five years. Bondholders would get new 5 per cent bonds for their present 7 per cent bonds, callable at 105 and with flexible sinking fund dependent on gross earnings. They would have the option of taking interest arrears in new common stock for each $5 of interest, or in cash to the amount of half the face value of the interest. Orono Pulp and Paper bonds would be treated the same as those of the parent company.

Bank loans, according to the plan, would be replaced with secured notes at $1,152,000 with a five-year maturity bearing 4 per cent. Preferred stockholders would get four shares of new common and common stockholders one share of new common for each share of old, plus the right to buy one share of new common for each two old common at $5 each, a privilege to be taken within 35 days of confirmation date of plan.

The company filed its statement for 12 months ending August 31 showing a net of $380,000 after allowance for all charges including bond interest. Part of Eastern's success has been a favorable rayon pulp contract. A proposal to modify the amount shipped on this contract from 3,000 to 2,000 tons and so extend the life of the contract was before the courts recently. The price of $97.50 per ton was to be unchanged.

ANOTHER NEW USE FOR PAPER

Commanding wide attention from artists and architects is the discovery that makes possible new decorative benefits for offices, homes and libraries through the medium of photographic paper.

Murals of "blown-up" photos, the work of the Dan Sayre Groesbeck, internationally renowned artist, already adorn public buildings in 25 cities. Mr. Groesbeck's largest work of this kind is located at the Santa Barbara (Calif.) county court house. This is reputedly the largest photographic mural in the world.

The photographic mural is also gaining favor in Hollywood where its use in current pictures is calculated to spread the vogue. Some especially fine ones are to be seen in the forthcoming movie, "The Young in Heart," the finished job in this case being 32 feet x 32 feet. Through a special process, small negatives are blown up step by step until they reach their ultimate size. In the final operation the various segments are fitted so carefully that lines of juncture are scarcely noticeable. Artist Groesbeck reports that none of the original art values are lost in the enlargement. In the above-mentioned picture, which showed scenes in an engineering office, the murals serve to heighten the sense of vigorous industrial activity.

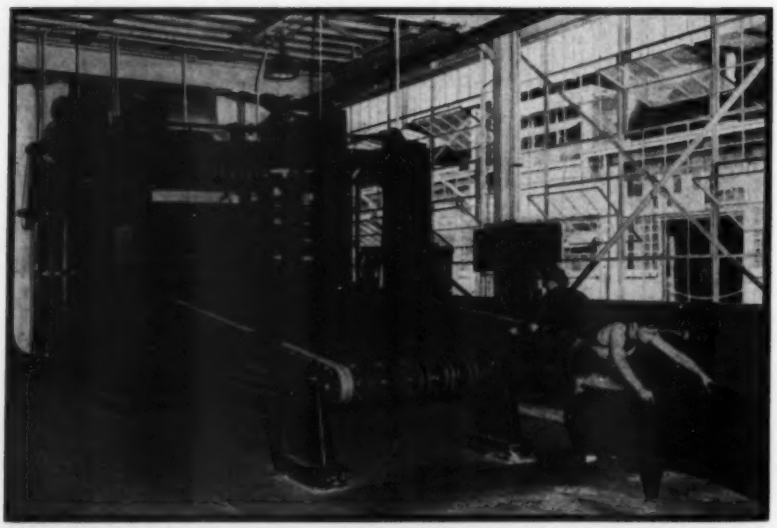
To give a proper air of solidity to some long-established mercantile house, on the other hand, murals were similarly used by E. A. Freudeman, the gifted Hollywood decorator, in the motion picture "Easy Living," from which the photo on page 722 was taken. The shots, loaned by Mr. Freudeman from his private files, shows the Wall Street of 1839, where the business depicted in the motion picture had its inception. Hansom cabs and other such horse-drawn vehicles lend interest to the paper's pattern.

NEW BOARDMAKING UNITS AT FORD MOTOR COMPANY

REPRESENTING extensive pioneering activity in the manufacture of paperboard for use as automobile upholstery backing, the new machinery units and paper mill facilities installed at a total cost of $300,000 in the River Rouge plant of the Ford Motor Company are now in use.

Operation and specifications of the newly-installed 1825-ton hydraulic press and the giant, high-speed drying machine are much different from those of machines generally used in paperboard manufacture.

The drying machine was built especially for the handling of Ford resin board. It is 160 feet long and has eight levels of rollers on which board sections are conveyed from feed end to discharge end, through three different heat zones. There are 2,500 rollers in all, each three inches in diameter and 114 inches long. The machine can handle board up to eight feet wide.



Binder board being placed on automatic loading tipple of drying machine in Rouge paper mill.

In the Ford paper mill, board sections go from the binder board machines to hydraulic presses and from them to the new dryer. An automatic loading tipple carries board sections to each of the dryer levels, feeding it onto the rollers at the forward end of the first heat zone. From this point, the board is conveyed automatically through the dryer. In the first zone it is subjected to a 250-degree Fahr. heat and a counter air flow. In the second zone there is a parallel air flow, with the heat stepped up to 275 degrees, while in the third zone temperature is decreased to 240 degrees Fahr., with the air flow remaining parallel. Temperature and air flow, as well as a specified humidity, are maintained automatically in all three zones.

The drying machine mechanism is enclosed in a metal housing backed by a three-inch insulating layer of glass wool, preventing heat loss. Despite the 240 to 275-degree temperature inside, the outer surface of the drying machine is cool to the touch. The unit has a capacity of 35 tons each 24 hours.

From the drying machine, the paperboard is conveyed to the new high-power hydraulic press, designed to submit resin board to very high heat at tremendous pressure to achieve a flow of chemicals required to make resin board of the hardness required for use in cars.

The press consists of 30 tubular steel platens, mounted vertically, each 45 by 90 inches and one and one-quarter inches thick. The platen facing is stainless steel. Tubular steel is used in the platens to handle steam, and water flows by which heating and cooling is achieved. Pressure is applied horizontally with a steam-driven reciprocating pump providing the motivating power.

The board, of room temperature, is loaded from the top. Pressure is applied as the board is heated to 250 degrees Fahr. Top pressure is 850 pounds per square inch, with peak pressure and temperature maintained for nine minutes. The board is cooled for six minutes with the pressure being maintained, after which pressure is released and the board removed. The entire cycle of operations, application of heat and pressure and release of same, is automatic throughout.

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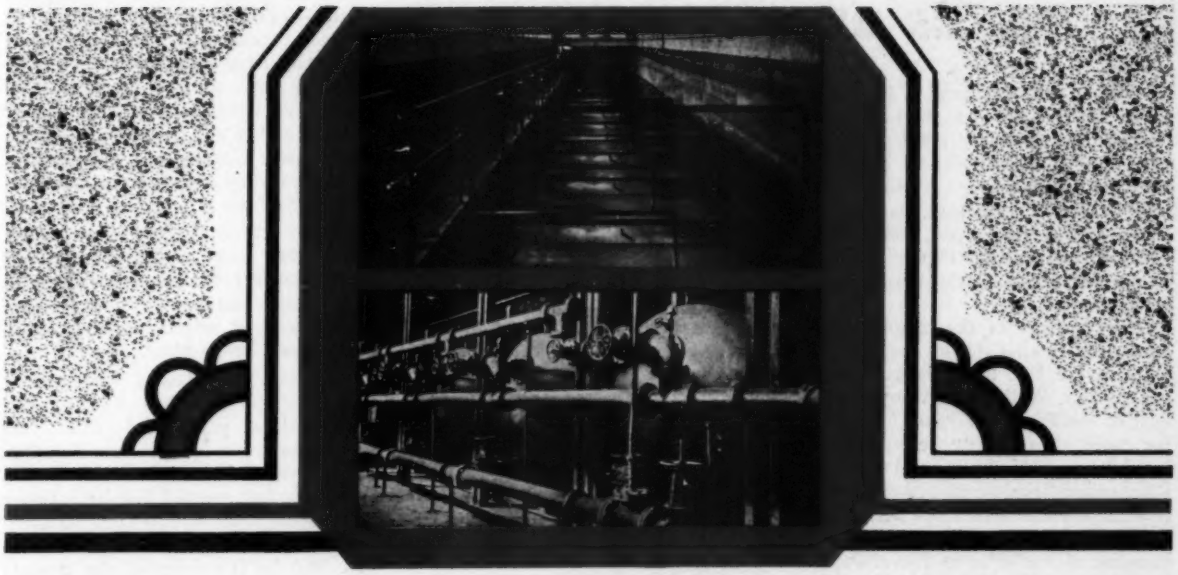
▶▶▶ THE KEITH PAPER COMPANY of Turners Falls, Mass., whose existence has been threatened for the past several months, will remain open as a result of loans secured to finance a reorganization plan. The company is to continue operations without vast personnel changes, it was reported.



WHY YOU SHOULD CHECK UP • ON YOUR FILTERS •

You should check up on your water filters now because seasonal changes in water pollution make changes in the water which can put an extra load on your filters and lower the quality of water delivered. With good water the starting point of making good paper it is important that your filters be in A-1 condition.

It is true that you may have Norwood Filters that are so darned dependable that you give them very little thought. It is also true that you may have them tucked away in the basement where about everybody else forgets them too. So guard against trouble that may raise havoc with production — by taking a trip down to the basement to look your filters over.

Check your filters thoroughly, point by point. Are they delivering ample capacity? What are you getting for color? Are your filters in good repair? Do you need new sand and gravel? Do you need a new air system or strainer system? Have you got sufficient coagulating or mixing space before filtering? Could you get a better quality paper with an even better quality of water? Do you need a modern chemical feeder? Are you having trouble with periodic water disturbances?

When you are through checking, we suggest that you tell us the results. Let us know how we can help you.

THE NORWOOD ENGINEERING CO.
16 No. Maple St., Florence, Mass.

A GOOD START AND A GOOD FINISH WITH

NORWOOD

DEPENDABLE WATER FILTERS AND PAPER FINISHING MACHINERY

Pressure and Gravity Filters • Web Super Calenders • Glassine Calenders • Sheet Calenders • Dampeners • Platers • Paper and Rag Dusters • Folding Machines • Special Machinery

NEW FOX RIVER PAPER CORP. TAKES OVER OPERATIONS

THE newly organized Fox River Paper Corporation was to take over operations at the Fox River Paper mills at Appleton, Wis., during the first week in October. Sale of the paper mill properties, buildings, machinery, water power, good will, and other assets of the Fox River Paper Company to the new corporation was announced September 12.

This was one of the largest transactions of its kind during the last ten years in the Fox River valley. With the transfer, William C. Wing, president of the Fox River Paper Company for more than twenty years, retired from the paper industry, and the Fox River properties were taken over by the new corporation headed by E. A. Oberweiser, formerly president and general manager of the Whiting-Plover Paper Company at Stevens Point, Wis. Mr. Oberweiser is president and general manager of the new corporation, and Colonel M. E. Roberts, formerly of Chicago, is executive vice-president. Other officers are Richard F. Bellack, formerly of Wausau, vice-president; William M. Roberts, secretary, and David E. Oberweiser, treasurer.

No announcement was made of the purchase price, or of any change in policy or personnel. The transfer involved the Fox River mills, the Telulah mill, the former Patten Paper Company property, and all the water power rights owned by the Fox River Paper Company. The company has been one of the largest manufacturers of rag content paper in the United States, and is one of the major paper mill properties in Wisconsin. The company's products are nationally known, its list of watermarked bonds and ledgers including Wall Street, Old Badger, English, New Era, and Right-of-Way. More than 400 persons are employed.

E. A. Oberweiser, the president of the new corporation, was for 27 years identified with the Whiting-Plover Paper Company at Stevens Point, Wis., from 1910 until his retirement from that company last December. During all of this period he was the company's general manager and during the last seven years, following the death of George A. Whiting, also its president. Prior to becoming president, he was also secretary-treasurer. The years of Mr. Oberweiser's connection with the Whiting-Plover were marked by steady progress for the company.

Colonel Roberts, executive vice-president and manager of sales for the new company, formerly was general sales manager of A. B. Dick & Company of Chicago, manufacturers of the Mimeograph machine.

Mr. Bellack, who formerly lived in Stevens Point, but more recently has had his headquarters in Wausau, was until a short time ago advertising manager for the Whiting-Plover Paper Company. He also is one of the owners of the Storey-Bellack Company of Wausau, printers, and has other business connections.

David E. Oberweiser, son of E. A. Oberweiser, who has been living in New York, formerly was with the eastern sales office in that city of the Whiting-Plover Paper Company, while William M. Roberts, son of Colonel Roberts, has been a salesman with A. B. Dick & Company, with headquarters in Chicago.

The new corporation has filed Articles of Organization at the office of the Outagamie County Registrar of Deeds at Appleton. There are 5,000 shares of preferred stock at $100 par value and 5,000 shares of common stock at no par value.

EASTERN PULP

An erroneous report appeared in a New York paper stating that Boston and Portland had been embargoed against wood pulp imports because of congestion. Nothing of this nature has occurred or is contemplated, despite slight congestion recently at Portland, Maine. Albany, N. Y., experienced some trouble of this kind and an embargo was planned there for October 1, but water shipments up-river would not be possible much more than a month later at any rate.

The fact is that surplus resale pulp has been diminished at northeastern ports and the attitude of importers and domestic mills is somewhat stiffer. They have done all the converting of contracts they propose to do, and unless pulp in storage is damaged or in some way requires quick liquidation, they are making little effort to push it on the market. Most of the stock is held for consumers' orders. The report that an eastern papermaker closed his own mill and bought bleached sulphite from another plant at $46 because he couldn't afford to make it at a lower cost than $50 has been going the rounds of the trade. Whether this is true in all details or not, it is a fact that mill men are firmly refusing contracts for cheaper unbleached sulphite than $40 dock and won't discuss 1939 shipment prices. It is also true that importers have insisted on more than $40 for some unbleached sulphite if the buyer wants it shipped in 1939. This is a reflection of the mill attitude in Sweden, Norway and Finland and is confirmed by reports from American consular offices.

There are, as always, a few strong unbleached pulps at lower prices for quick delivery, but consensus of opinion has revealed that there is not a foreign bleached sulphite that is really prime pulp below $50.

Southern kraft mills are quoting northeastern converters $32 to $35 delivered but paperboard manufacturers claim it has been bought for $30. A paperboard manufacturer of the northeast has asserted that he is better off buying kraft at $30 than his competitors who may own southern mills. At least he is convinced that it costs more to make and deliver it. After extensive dickering, one Swedish kraft pulp was bought rather extensively at $35 dock but there is an escape clause in the contract permitting an upward revision next year if market conditions warrant.

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POWELL RIVER-SCRIPPS-HOWARD HAVE CONTRACT

Regarded by eastern producers as of great significance was the announcement of the negotiation of a long-term newsprint contract between the Scripps-Howard interests and the Powell River Company on the basis of the prevailing New York price of the major eastern producers, exclusive of Great Northern Paper.

The significance lies not in the tonnage involved, which totals some 55,000 tons, but in the fact that the stipulated price is to be the prevailing New York base price of the major Eastern producers.

Of the two contracts, one is with the Powell River Company and involves some 15,000 tons per annum over a period of five years. This tonnage has, until now, been largely supplied by Scandinavian mills. The second contract which is said to involve some 40,000 tons per annum, has been entered into with Donohue Brothers, who operate a two-machine mill at Murray Bay, Quebec. The Scripps-Howard interests are said to have decided that it would be good business to contract with Canadian producers in view of the uncertain situation abroad.

WE INVITE YOU TO READ THIS REPORT

WILLIAM L. BARRELL COMPANY
INTERHOUSE LETTER

BOSTON OFFICE

DATE: Sept. 19, 1938

ATT: Mr. W. A. Barrell, Treasurer

SUBJECT: SIAMESE "TOUR BOSS" trial results

I give you herewith my report covering all installations.

Life	In many cases they had already equalled the life of regular dryer felts and were still running. In one case they had exceeded the life of a regular felt by at least 30%.
Drying Pressure	One reduction 25 to 16 pounds, one 12 to 8 pounds, as against immediate former felts with same grade and speed. Where pressure was not measured, the invariable comment was that the paper was more uniformly dried.
Stretch	In no case had it been necessary to cut out the original seam due to stretching of the felt.
Narrowing	In most cases the loss in width was less than 1% and in no case was it over 3%.
Seams	Sewed—riveted—and cemented are being successfully used.
Speeds	SIAMESE "TOUR BOSS" Felts are operating at from 250 to 900 feet per minute.
Paper Grades	Books—news—wrapping—kraft—coated.
Costs	Customers advise appreciating lower initial cost, lower dryer felt costs per ton than with any other felt, plus saving in steam consumption or increased speed possible.
Repeat Orders	Every user has reordered.
Recommendations	SIAMESE "TOUR BOSS" Felt should not be run with old fashioned hard working guide blocks.

This type can now be offered to all paper trade as all tests warrant its acceptance.

Charles K. Dillingham

Sales Representative

YOU CAN SECURE THESE ADVANTAGES BY ORDERING
SIAMESE "TOUR BOSS" DRYER FELTS
"PATENT APPLIED FOR"

William L. Barrell Co.
Boston, Mass.

CANADIAN FIRM TO BUILD NEW MILL IN QUEBEC

A new mill is to be constructed at Cap de la Madeleine, near Three Rivers, Quebec, by International Foils, Ltd., a newly-organized Canadian company, an interest of the British American Tobacco Company, Ltd., of London, England. The mill will produce aluminum foils and tissue paper, as used for cigarette manufacture and wrapping.

Total cost of the new mill has been estimated to be about $1,200,000, of which $400,000 will be for buildings and $800,000 for machinery and equipment. Contract for the erection of the building has been awarded to Fraser-Brace Engineering Company, Ltd., of Montreal. The plant is scheduled to be completed next spring.

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▸▸▸ THE MINNESOTA AND ONTARIO PAPER COMPANY has moved its headquarters office of the Merchant Sales Division to Chicago where it is now located at 205 W. Wacker Drive. The company has announced that the sole purpose for the change is that it may be more centrally located.

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SHIPS CARRY FLORIDA PULP TO CHICAGO

The first water shipment of Florida wood pulp ever received in Chicago was unloaded recently from the S. S. Bennington at the dock of the Ogden Avenue plant of the Container Corporation of America.

The boat carried a cargo of 2,000 tons, which was sent from Fernandina by ocean freighter, transferred to canal barges at New York, and then transshipped to the lake steamer at Buffalo. The paper pulp, shipped in bales weighing 400 pounds each, was made in the Container Corporation's new mill at Fernandina. The Container Corporation plans to make other shipments by water from Florida to Chicago.

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25TH ANNIVERSARY OF ONTARIO PAPER

The Ontario Paper Company of Thorold, Ontario, recently celebrated its twenty-fifth anniversary. For the period of twenty-five years, since it began to turn out 100 tons of newsprint daily for its owner, the *Chicago Tribune*, the company has not sold to any other paper except, in recent years, the *New York Daily News*, which is under the same ownership.

The Thorold mill was built just after the removal of the duty of Canadian newsprint entering the United States. The reason for its construction, it was said, was that the owners of the *Chicago Tribune* felt that under the conditions then prevailing, they could not buy newsprint as favorably as could their principal competitor.

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▸▸▸ THE PORTLAND (MAINE) PORT AUTHORITY is undertaking to secure from the State and Federal Government money to expand the State pier, which is used very largely for the discharge and storage of wood pulp from Scandinavian countries and the West Coast. A new conveyor system and entirely new and large pier are involved in the plans.

◆

WISCONSIN FLOOD WATERS RECEDE

After more than two weeks of almost continuous rain during the first and middle parts of September, the Fox and Wolf rivers rose to almost record levels. With clear weather, however, waters receded rapidly and put an end to the threat of serious flood conditions.

All gates at both the Neenah and the Menasha (Wis.) dams were opened, including two that had never been opened before. In the Neenah branch of the Fox River the water was the highest it had been since 1921. Several paper companies, including the Sawyer Paper Company and the Bergstrom Paper Company, were forced to move their supplies of stock to prevent water damage. Operations in the Fox Valley, however, were not seriously hampered by the high water.

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ABITIBI PROBLEM STILL UNSOLVED

While no official steps have been taken by any of the groups involved in the Abitibi Power and Paper Company situation towards reorganization, it is understood that an appeal against the judgment of last June, when the Ripley plan for reorganization lost out, is unlikely. The Bondholder's protective committee, sponsors of the Ripley plan, had until October 12 to launch an appeal. It is felt, however, that the judgment of two courts has definitely shown that the Ripley plan could not be carried out under the amended Ontario Judicature Act.

RECONSTRUCT C-W HEADWORKS

Reconstruction of the headworks supplying untreated water to the Crown Willamette Paper Company plant in Camas, Wash., was to have begun October 15, according to company officials.

L. H. Hoffman Company of Portland, Ore., has been awarded the contract, which calls for replacing the present wood forebay with one of reinforced concrete construction. New steel gates for water control will be installed, together with new trash racks. There also will be a new timber setting basin with an overflow and drainage channel.

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CANADIAN NEWSPRINT

For the first time in six years, Canadian newsprint consumption in August failed to show a seasonal pickup over July. As a result, reversing the trend of the two preceding months, Canadian newsprint production in August exceeded shipments by a substantial margin, an output of 220,303 tons comparing with sales of 204,668. During the month the industry operated at 60 per cent of capacity, against 59.5 per cent in July. The month's operating rate was the highest since March, the month's shipments lowest since May.

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FINANCIAL

ALTHOUGH paper production in September advanced to a new high for the year, allowing for the Labor Day holidays, the European crisis had a depressing effect on paper company securities. With the crisis over on the last day of the month, however, prices for such securities were materially higher than during the tense days when it was uncertain whether there was to be war, and gave indications of reflecting the increase in production which has been steady, though slow, during the normally dull summer months.

Some financial reports of the month follow:

Albemarle Paper Mfg. Company—Earnings for quarter ending June 30 were $35,421 as compared with $177,975 for the same quarter of 1937.

A. P. W. Paper Company—The Stock Exchange has been notified that the company will increase its authorized common stock from 268,500 shares to 730,000 shares of no par value.

Celotex Corp.—The quarter ending

Every Joint Is STRONGER Than The Pipe Itself!

There's no "weak link" in a welded piping system when Grinnell Welding Fittings are used. For these fittings permit every weld to be a plain circumferential butt weld — strong, easily made by any qualified pipe welder.

Take the guesswork out of welded piping by using these fittings. Their properties and working pressure-temperature ratings are identical with the pipe itself. They are seamless — produced by a patented hydraulic forming process — stress-relieved to retain their shape after welding.

For a simple, economical welded piping job, free of ragged sharp corners, slag inside the pipe, nondescript welds — for assurance of clean, smooth inside surfaces, specify Grinnell Welding Fittings. 32-page descriptive catalog on request. Grinnell Company, Inc., Executive Offices, Providence, R. I. Branch offices in principal cities of U. S. and Canada.

WELDING FITTINGS BY **GRINNELL**

WHENEVER PIPING IS INVOLVED

July 31 showed a net profit ot $161,319, or 40 cents per share for the common stock after payment of the preferred stock dividend, compared with a 27-cent return for the previous quarter, and $1.05 for the same quarter of 1937.

Detroit Paper Products—Net loss is reported for the first six months of the current year of $60,732 as compared with a profit of $86,271 for the same period of 1937.

Flintkote Company—Profit for 52 weeks ending July 16 was $615,817 or 92 cents per share, compared with $1,358,868 or $2.03 for the previous year.

Masonite Corp.—Net profits for 10 of the 13 periods of the fiscal year were $798,623 as against $1,318,081 for the same period of the preceding year.

Nashua Gummed and Coated Paper Company—Net income for the year ending June 30 was $129,856 as compared with $412,168 for the preceding year.

Nekoosa-Edwards Paper Company—Net profit for the period Jan. 1 to July 16 was $30,324 as compared with $302,447 for the first half of 1937.

Puget Sound Pulp & Timber Company—Profit of $21,142 is reported for the first six months of this year, compared with profits of $254,998 for the entire year of 1937.

United Paperboard Company—Net income for the year ending May 28 was $36,781, as against $150,684 for the previous year.

S. D. Warren Company—Profits for the first half of this year were $95,890, as against $402,195 for the same period of 1937. In the second half of the year, however, production has been stepped up to 5 days per week.

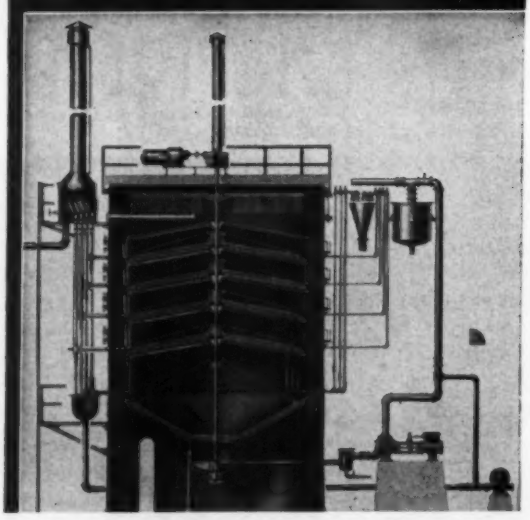
AMAZING RESULTS with the

SEIP CLARIFIER

Shorter Settling Time

Greater Capacity

Greater Solids Recovery



The Seip Clarifier concentrates sludges incident to the recovery operations of soda and sulphite pulp mills and recovers fibers and other suspended solids from paper mill white water.

Based on the principle of *Upward* Filtration, the Seip is at least 14 times as effective as clarifiers where the filtering process is downward.

In old-style settlers, liquid enters through a center downtake, but the Seip intake is located around the tank's periphery, thus providing ten times the intake capacity. This slows down the flow of liquid considerably and minimizes agitation to liquid.

The Seip is made in any desired size. Although furnished complete with leak-proof, welded steel tank, the clarifier mechanism can, in many instances, be installed in present settling tanks and will greatly improve capacity and efficiency.

Made by the Graver Organization, who for three-quarters of a century have been leaders in the manufacture of metal tanks for all purposes, water treating equipment, water softeners, filters and sterilizers, kilns, swim pool systems, etc.

Consult them about your clarifying problems and send for complete data about the Seip.

GRAVER TANK & MFG. CO., INC.

75 Years of Dependable Service

New York, N.Y. East Chicago, Ind. Chicago, Ill. Catasauqua, Pa.

New York Stock Exchange—Stocks

	1938 Closing Sale Aug. 31	Closing Sale Sept. 30
Celotex	23	22¼
Same Preferred	66½	68
Certain-teed Products	10	9¾
Same Preferred	38½	39
Champion P. & F. Co.	*22–23⅞	24
Same Preferred	97	95
Container Corp.	15	14⅞
Cont-Diamond	*8⅞–10¼	9¼
Crown Zellerbach	12⅜	13
Same Preferred	78	80
Dixie Vortex	12	9½
Same "A"	32	31½
Robert Gair	4¼	4
Same Preferred	*12⅜–14	*11¾–16½
Inter. P. & P.	9⅛	8⅞
Same Preferred	39¼	38½
Kimberly-Clark	*26¼–29	*24–25
MacAndrews & Forbes	*27–29	29
Masonite	52¼	53¾
Mead Corp.	12¼	12¼
Same Preferred	*66½–67	65
Paraffine Co.	——	47½
Same Preferred	——	99½
Rayonier	11½	13⅞
Same Preferred	18⅜	20
Scott Paper	47¼	49½
Union Bag & Paper	12⅞	12⅜
United Paperboard	7	6¼
U. S. Gypsum	97	100
Same Preferred	168	*150–167

New York Stock Exchange—Bonds

Celotex 4½%	——	81¼
Certain-teed	78⅜	78½
Champion P. & F.	98	98⅞
Container Corp. 5%	95¼	——
Inter. P. & P. 6%	85	85
Same 5%	——	89⅜
Mead Corp.	103¾	103½

New York Curb Exchange—Stocks

Am. Boxboard	*9¼–10	*9–10
Brown Co. Pfd.	25¼	24
Detroit Pap. Prod.	*2½–2⅞	*2½–2¾
Great Northern Paper	29	*29½–31
Hummel-Ross	*3⅞–4⅛	*3¾–4¼
National Container	*6¼–7	——
St. Regis	3	3¼
Taggart	*5⅛–5½	4¾
United Wall Paper	2¼	2¼

*Closing Bid and Asked Prices.

THE "Extra-Service" Lead

Extra service in extra-difficult situations — that's the net of the Tellurium Lead story. This lead welcomes tough assignments — thrives on hard knocks.

Many of Tellurium Lead's best service records have been made in plants handling acids under conditions of extreme severity. Users report increased resistance to sulphuric and other corrosive acids, even at temperatures that tend to approach the melting point of the metal. In plant after plant, it has prolonged the life of equipment . . . and reduced the number of shutdowns for repairs.

Another highly important property of Tellurium Lead is this: *It toughens under stress.* When rolled, stretched or hammered, it actually becomes stronger. As a result, turn-over points and joints are less subject to cracking. Furthermore, where vibration occurs, this capacity to develop latent strength minimizes buckling and creeping. This same quality also gives Tellurium Lead improved resistance to fracture due to repeated heat changes.

Tellurium Lead of our manufacture is time-tested St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this well-known chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write our nearest branch.

Typical User Reports

"1¼" x 6 lbs. Tellurium Lead coil is used in a bath of 10 to 20% sulphuric acid and water with a steam pressure of 5 to 15 lbs. and a temperature of 170° F. Tellurium Lead has not shown any signs of oxidization after four or five times the length of service of lead formerly used."

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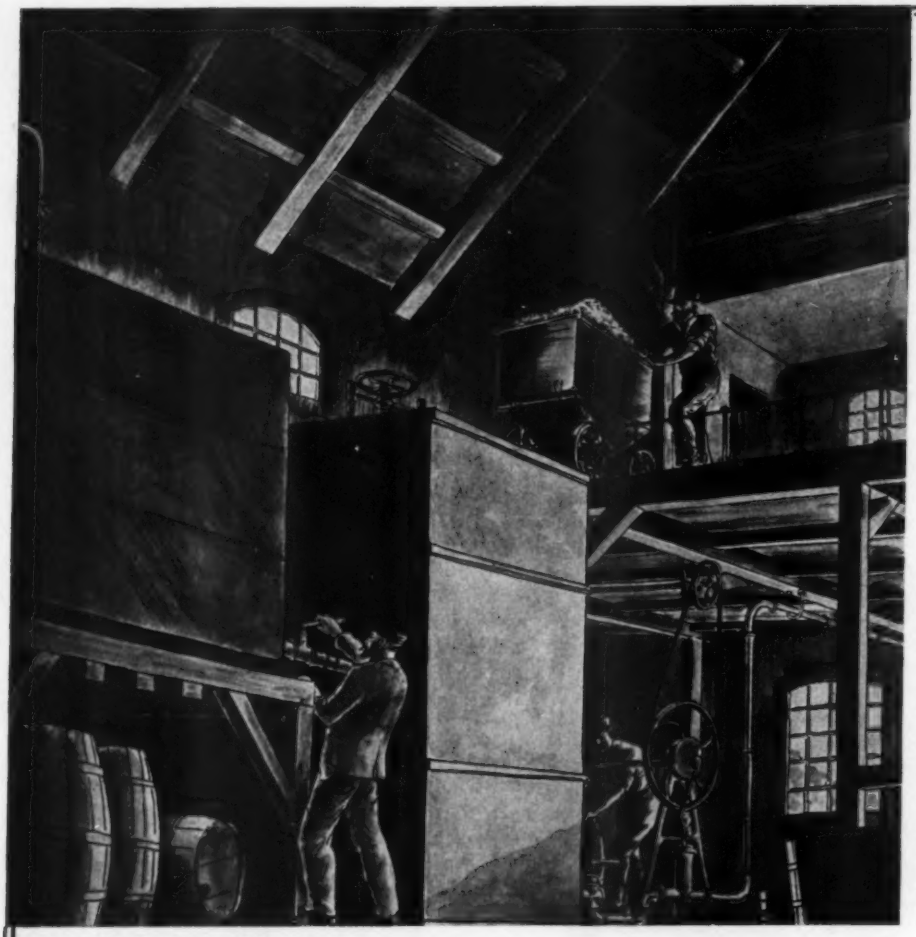
Tellurium Lead



Part of Early European Soda Plant

Through The Centuries With Alkalies

During the middle of the last century, when soda was made almost wholly by the Le Blanc process, various patents were taken out for the manufacture of soda by another process, now known as the ammonia-soda process. This process, which made use of chemical reactions made known years before by John Thom, a Glasgow chemist, and by others was gradually developed until by the close of the century it had largely replaced the Le Blanc process.

It is the ammonia-soda process, refined to the last degree, by which COLUMBIA Soda Ash is made. From the start this process found favor due to its relative simplicity, lower cost, and to the high degree of purity of the soda ash produced. This purity approaches the absolute in soda ash bearing the COLUMBIA trade-mark.

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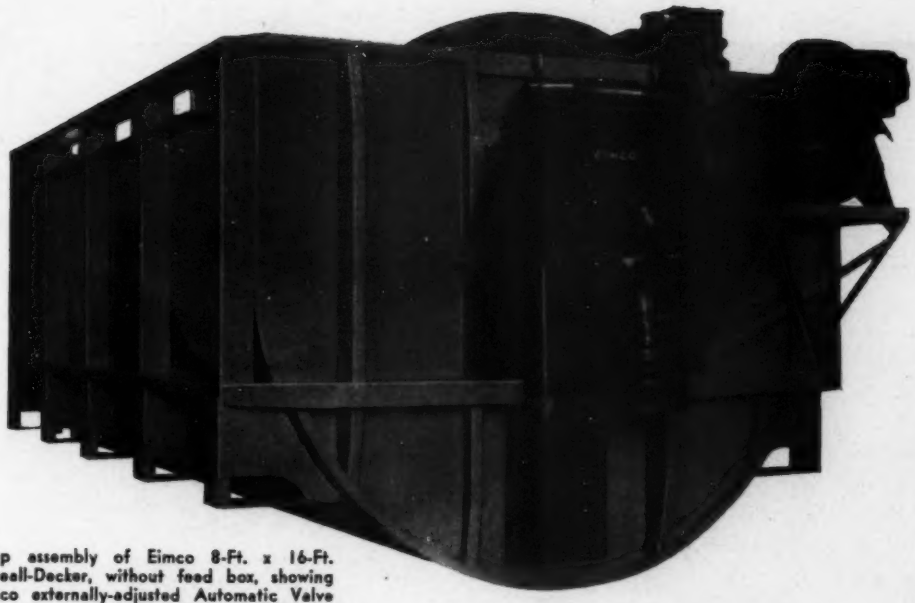

Shop assembly of Eimco 8-Ft. x 16-Ft. Saveall-Decker, without feed box, showing Eimco externally-adjusted Automatic Valve and compact, float-controlled, variable-speed drive.

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APPLICATIONS

Eimco Paper Pulp Filters, with suitable modifications in design and construction, are recommended for use as Save-Alls, Save-All Deckers, High-Density Thickeners, Brown-Stock Washers, Bleach Washers, and Lime-Mud Filters. All types are manufactured in a wide range of standard sizes to meet individual requirements. Engineering suggestions and preliminary designs to meet any specific requirement will be furnished promptly on request, without charge or obligation.

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Editorial ★ ★ ★

PROFITLESS PROSPERITY

▸▸▸ THE WAR SCARE is over; the world series is on and soon will be concluded. The clean-up of the hurricane damage in the six eastern states is in progress rapidly; the stoppage of the Roosevelt ideology is assured; and general business volume is up five points in the United States over the same date a month ago and is going higher. Surely, the outlook is rosy.

It does look so from a volume standpoint.

From a profit standpoint, however, the prospects are thin.

Every division of industry is feeling the expanding urge for goods. The railroad carloadings for the past three weeks testify to that point.

But no division of industry has enjoyed such an expanse of business as the paper industry during the past four months, with orders continuing to climb to almost 90 per cent of capacity in some lines, and yet every mill is losing money and nobody connected with the production, sales, or distribution of this unprecedented movement of tonnage is making any profit.

Now, profit is as essential to industry as blood is to the human body. If the veins or arteries of the human body are cut and the blood is allowed to ooze out, the carcass finds its resting place on the undertaker's slab. And just so, when the prices of paper are cut and the profits are allowed to ooze out unstopped, the corporation finds its resting place on the financial undertaker's slab, which is the bankruptcy court. Profitless prosperity takes all the joy and zest out of business and is as devoid of pleasure and romance as is the embracing of a bloodless carcass in a county morgue.

Who are responsible for the profitless prosperity days we are now going through? Business men!

Business men have it in their power to-day to put industry and commerce on a paying basis. There exists no longer, the excuse that there is not enough volume to go around and therefore, the larger units of a manufacturing division are justified in cutting their prices to get tonnage to run their plants. Certainly, this is not true in the paper industry, where peak production for everybody is in sight and enough for every unit to run at a profit is a present fact, if mills will adhere to their published quotations.

Business management is facing the day not very far distant when investors, stockholders, directors and wage earners will demand a critical accounting from those who are responsible for the profitless prosperity operations, especially in the paper industry.

A CREED FOR MANAGEMENT

▸▸▸ SO INTERESTING AND FUNDAMENTAL were the remarks of Lewis H. Brown, president of Johns-Manville Corporation, on September 20, 1938, before the Seventh International Management Congress at Washington, D. C., in a speech entitled, "A Common Ground for Management and Labor," that an extract of them might well serve as a creed for management. The extract follows:

"We who are responsible for the management of industry in supplying the needs of the public for goods and services and who recognize our obligations to stockholders and employees, believe,

"That we should constantly seek to provide better values at lower costs so that more of our people can enjoy more of the world's goods.

"That we should strive to develop the efficiency of industry so as to earn a fair return for the investing public and provide the highest possible reward for the productivity of labor.

"That we should stimulate the genius of science and utilize the methods of research to improve old products and create new ones so as to continuously provide new fields of employment for the present and the coming generations.

"That management should encourage fair trade practices in business which, whether effected by competition or cooperation, will be so shaped as to be for the best interest of our customers and of society as a whole.

"That it is management's duty to be alert to its own shortcomings, to the need for improvement, and to new requirements of society, while always recognizing the responsibility of its trusteeship.

"That business in this country never has been what it could be and never what it yet will be.

"That Business, Labor, Government and Agriculture working hand in hand can provide jobs and the opportunity for all to work for security without loss of our liberty and rights as free men."

Such a creed, if practiced by all business, could not fail in making this world, more specifically this country, a better place in which to live. May its very precepts, simple as they may seem, become better understood, and, when nurtured in the light of growing experience, come to full fruition for the benefit of all mankind.

CURRENT THOUGHT

LET'S PUT OUR FAITH IN THE SCIENTIST

WILLIAM SIBLEY

I WAS one of the guests at a wedding recently. The young couple I know quite well, and I wish them every possible happiness. So far as my understanding of human nature and character takes me (which is a precious short distance) I believe the two of them will more than "make a go of it." But as I stood there watching the pretty ceremony, I couldn't help thinking that it is a most curious anomaly that while we eagerly welcome the advice of the scientist and follow, almost blindly, the direction he points in either industrial or medical matters, we scorn him when he tells us even more important truths concerning our personal affairs. And perhaps nowhere is this more strikingly apparent than in the institution of matrimony, without doubt the most seriously important and vitally affecting thing in everyone's life.

The miracles which have been accomplished by scientists in the field of animal husbandry and in horticulture are well known to most people. From race horses to radishes, the science of being well born has proved itself over and over again. And it has always seemed to me that common sense must someday, at long last, prevail in the matter of breeding human beings. But at the present time there is such a fog of sentimentalism and sheer maudlin nonsense surrounding matrimony, motherhood and fatherhood, that we still cling tenaciously to the primitive beliefs of our long-forgotten ancestors. In our popular imagination we assign a halo of veneration around motherhood, and consider a man who has just become a father as being somewhat ennobled—all the while blinding ourselves to the known truth that of every one hundred babies born something more than twenty are undesirable, giving promise of never being capable of becoming healthy citizens.

And the result is plain to see. Disease, feeblemindedness, poverty, crime, and all the other phases of social unrest. . . . No, I am not in the throes of a hang-over, nor on this day do I have a headache. . . . No headache save that of the human race which knows that in the best interests of society we must have regulation of health, sanitation and professional practitioners—that even a shoe-shining parlor must be licensed—yet continue blindly in the belief that to have a license to have a baby is an iniquity.

At every port of call and at every gateway along our wide borders we keep uniformed servants whose duty it is to keep out of our country the diseased, the criminal and the unwanted. Almost purely on the basis of eugenics we have erected immigration laws—against which very very few cry out; almost no one regards as an infringement of human rights. These things have been the development of scientists who have proved to us the way to go to protect ourselves. Yet we stubbornly refuse to make progress, even at the behest of those same scientists, in our infinitely more important individual social life. We still oppose anything which conflicts with our convenience, or which violates our inheritance of religious beliefs or social conventions.

It wasn't so long ago that Galileo nearly lost his head (literally) when he tried to upset the then popular opinion that the sun revolved around the earth. In science, physics and mechanics we have progressed far since that time. Soon there will be in service a telescope having a 200-inch lens. But even yet there is small progress discernible in the matter of our giving intellectual attention to a preacher of eugenics. We yet consider such foresighted men as radical disrupters of precious human instincts or basic privileges.

. . . Or—take another simple case in point: the law courts. Here is another great social field for the exploration of the scientist. Already they are undertaking that exploration (at the Johns Hopkins University, Institute of Law)—and thank goodness for that. I will place my money on the scientist rather than the lawyer to find out what is wrong with our court system. We have whole libraries filled with laws and yet everywhere there is confusion of thought and endless contradiction, even within the legal profession itself, as to the treatment of crime. Some say that the death penalty deters crime; others insist with equal conviction that it operates to the encouragement of crime. Statistics are cited to prove both claims. In the eyes of the legal profession both are right—because our law-makers know very little about the broader aspects of the effects of our laws. No physician would be permitted to practice if he had so little knowledge as to the effect of his drugs as our judiciary have as to the effect of the laws they attempt to administer.

The only thing we know about our system of law making is—that something is wrong. It isn't working. In spite of the multiplicity of laws and regulatory measures, our jails are filled to over-flowing with the lower-element of criminals and our public offices are filled with criminals of a higher-order. If, after 2,000 years of having the most wholesome of teachings to guide and inspire us, we cannot devise supplementary laws which will do more than clutter up both files and minds, then it is about time we turn to the scientist who looks at things from a material rather than a moral sense and because thereof arrives at a much saner conclusion.

It is to science that man must eventually turn for the cure of moral and social ills—as we have successfully turned to him for help in material fields of endeavor. The scientist is our closest friend. Let us give him freer scope.

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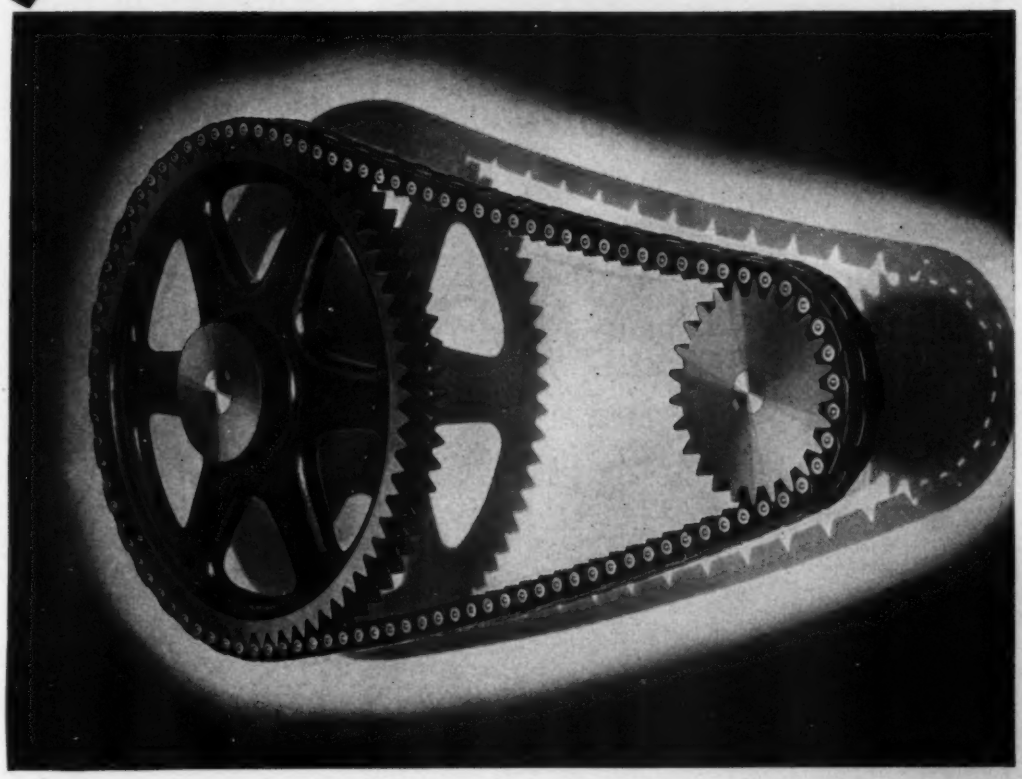

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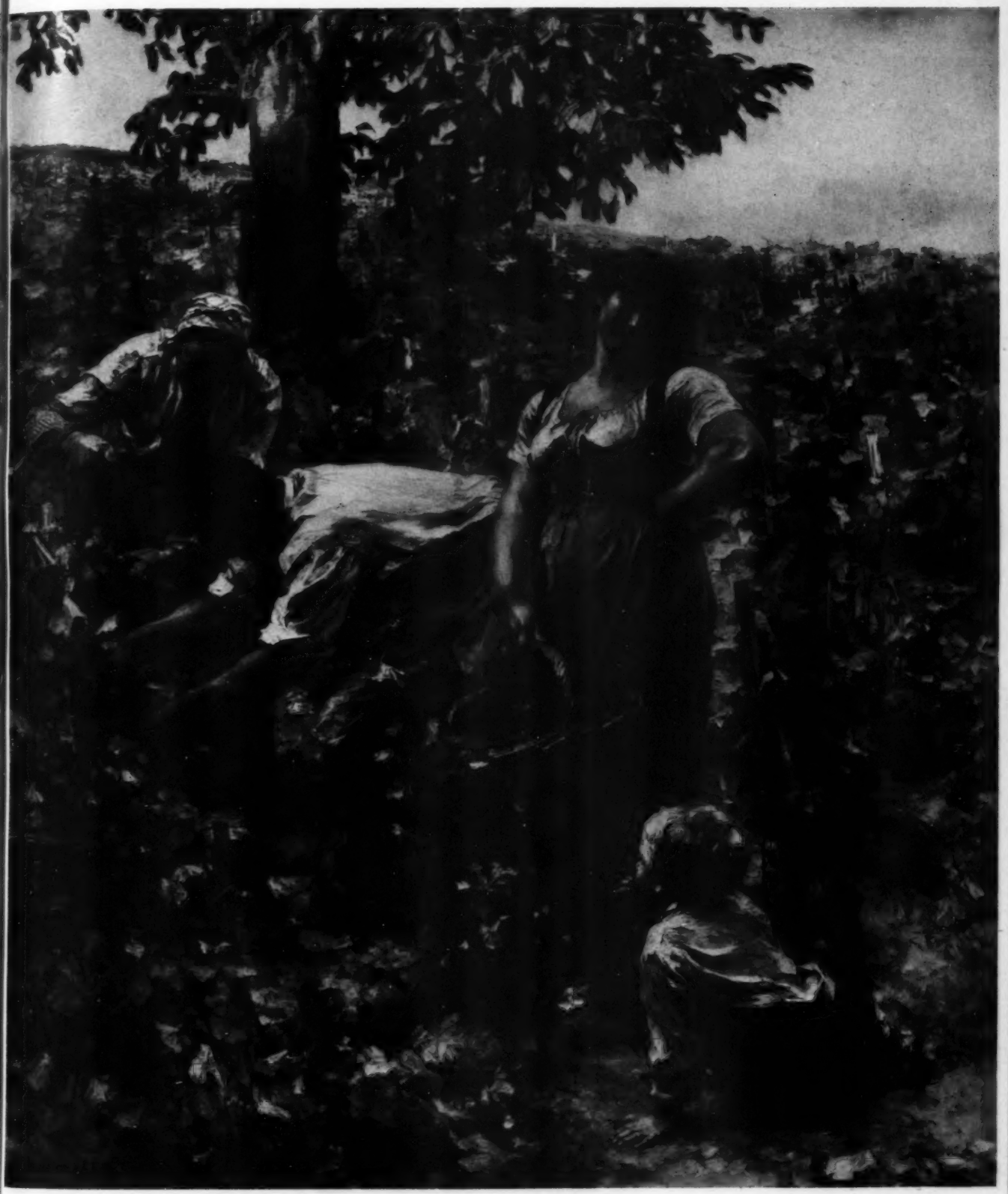

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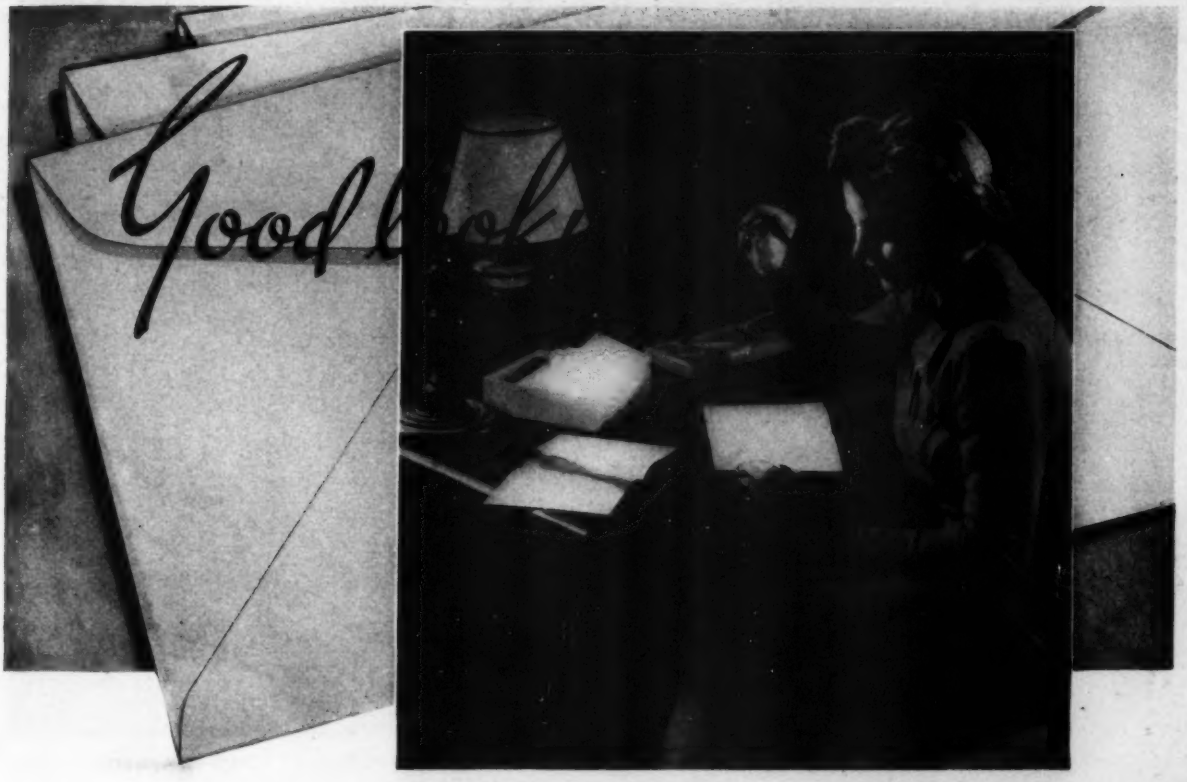

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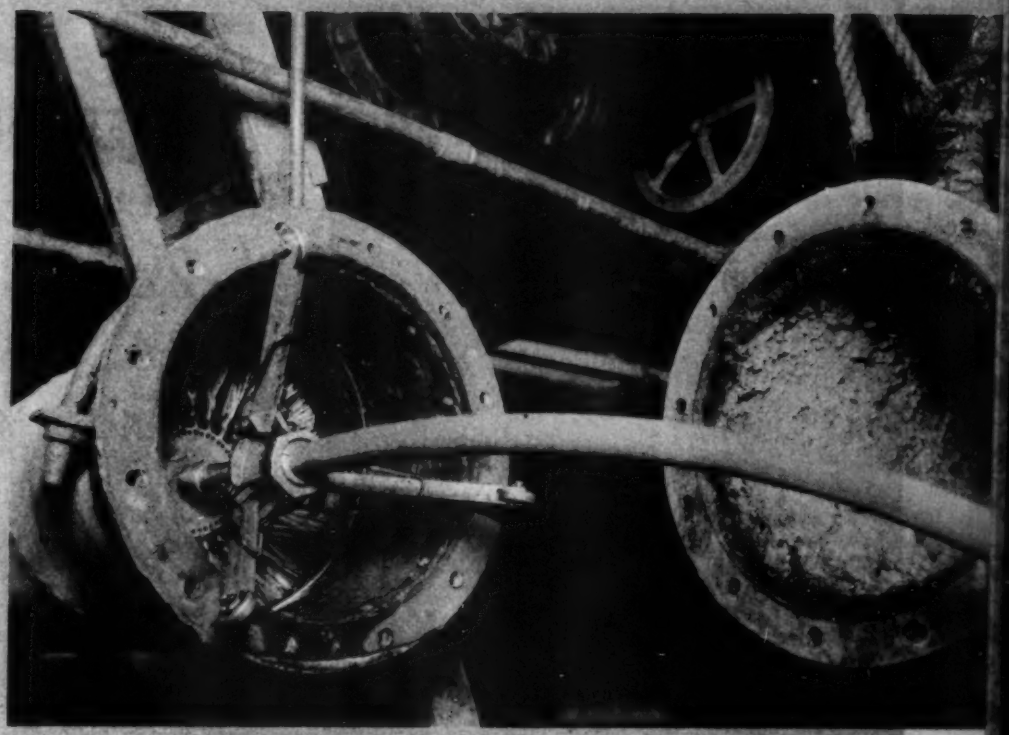

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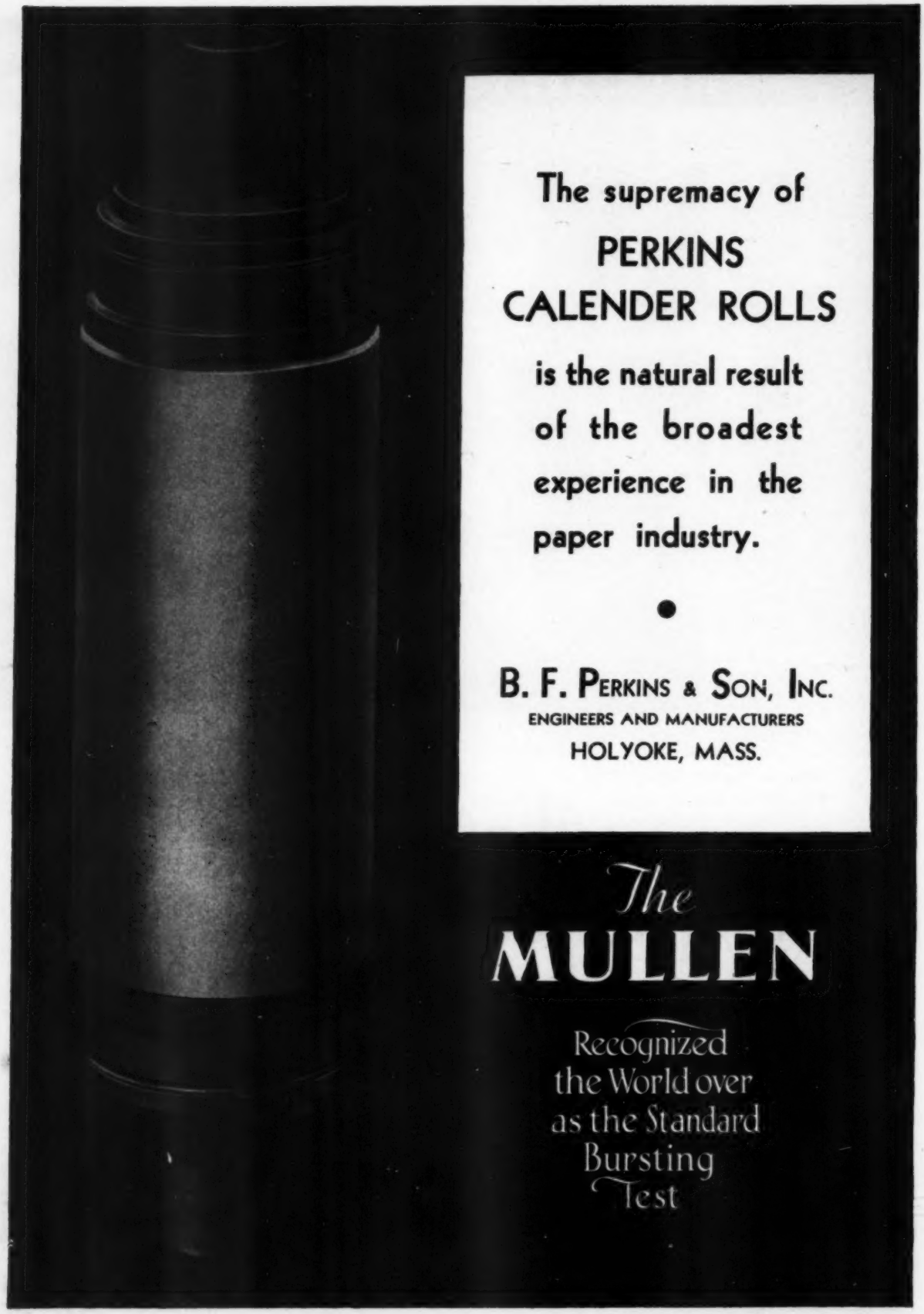
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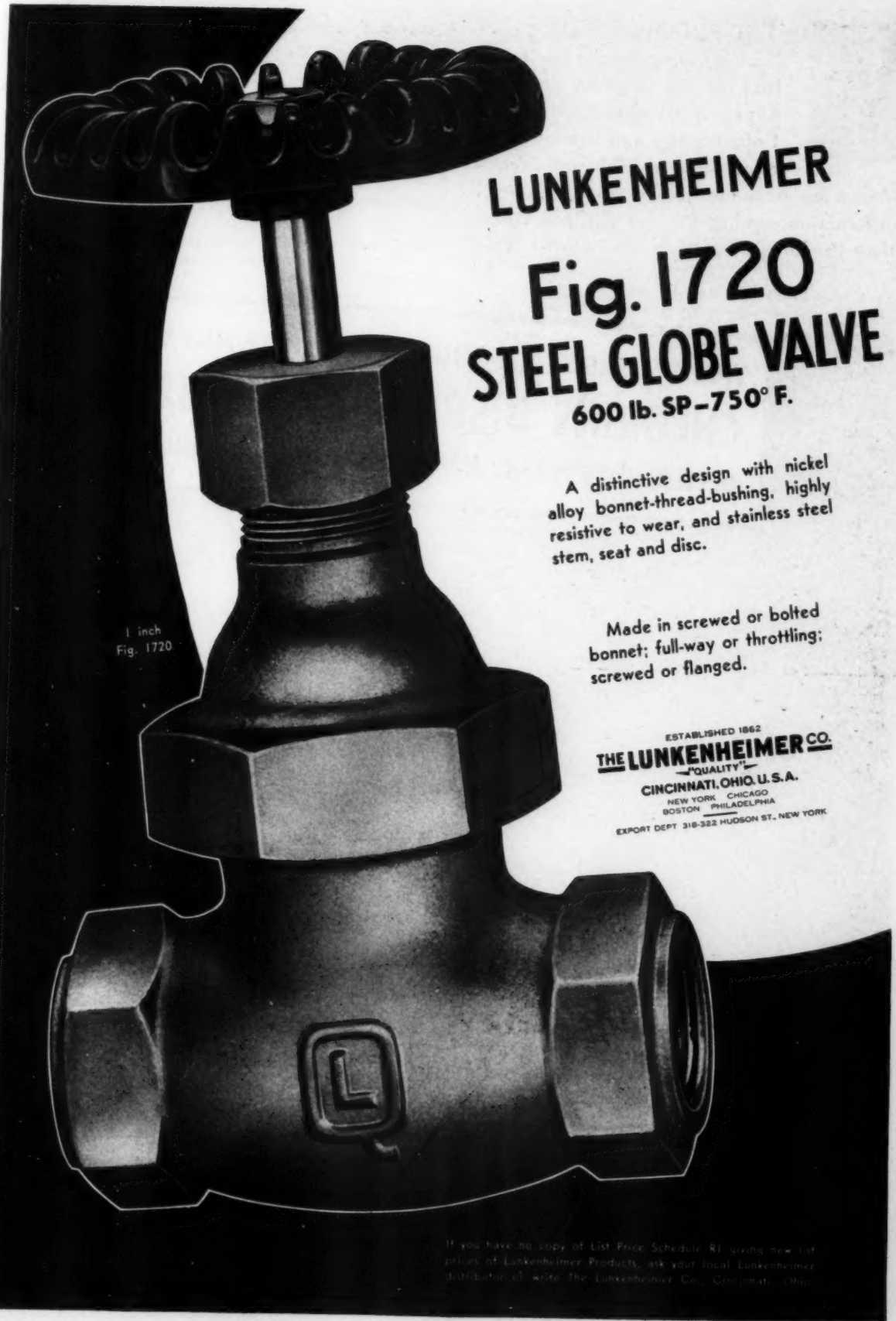

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* U. S. Patent 1,971,241, dated August 21, 1934. Also fully protected in twelve foreign countries.

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RYERSON STEEL-SERVICE

Rosin Content of Paper

JOHN F. REARDON and JESSIE E. MINOR

THE standard method for the quantitative determination of the rosin content of paper, as given in *Paper Testing Methods*, by TAPPI in 1929 is still in general use, although investigation leading to modifications for greater accuracy are in progress.

The delay in the development of a better method has been due, partly, at least, to the facts that the chemico-physical properties of the materials and the chemistry of the process are not clearly defined, retention figures from commercial runs are not easily calculated, and the method as given has brought reasonably good check results. However, more recent developments in the paper sizing industry have increased the need for greater accuracy in this test. For that reason, the Minor laboratory has attempted to make a study of the standard test method and the various suggested alterations with a view of adopting the best possible method for its use.

For some time, it has been the custom of the laboratory to weigh the rosin extract in the usual manner; then, to check the purity of the product, it would dissolve the extract in 10 cc of hot, neutral alcohol, titrate with 0.1 normal NaOH and calculate the rosin content from this titration value by the use of a predetermined factor.

For the usual run of relatively pure paper products, the titration number gives much more accurate results than the weight value and it is more easily manipulated; but care must be taken to insure the absence of any other titratable matter in the extract.

The double determination has a distinct advantage in unknown papers by aiding in detecting the presence of many foreign sizing materials as fats, waxes, etc.

In the present investigation, each set of tests was planned with a view to bringing out a comparison of the weight and titration values under various changes in manipulative details; also to bring out the efficiency of hydrochloric acid, as suggested by the Bureau of Standards *(1)*, in the alcoholic extraction, as compared to the usual acetic acid.

As a result of the laboratory's study of conditions, it is now believed that best results for retention calculation, as well as for concordance, should be obtained from a method which involves:

1—Extracting in Underwriters equipment, using alcohol and hydrochloric acid instead of alcohol and the usual acetic acid.

2—At the beginning of the extraction, having an acid solution in the extraction cup rather than only in the extraction flask. This more efficiently releases combined rosin.

3—Distilling the alcohol-acid solvent directly from the extraction flask with the aid of a connecting trap to avoid mechanical loss of rosin from the usual open evaporating dish method.

4—Washing with water-ether-acid and allowing same to stand over night for complete separation of layers.

5—Drying the extract at 100-105 deg. C, for one to two hours only before cooling and weighing.

6—Weighing the dried extract, redissolving in neutral alcohol, and titrating hot with 0.1 normal NaOH as a check on the accuracy of the weight results.

Table I—Rosin Extraction of Bond and Book Papers

No.	Type of Paper	Extraction Kind	Acid Amount	Extr. Hours	Washing HCl Used	Washing Hours	Purification	Rosin by Weight	Rosin by Titration
1	Bond	Acet-c[2]	5cc-3.3N[1]	2.5	5cc-2.5N	18	filtr.	1.764%	1.629%
2	Bond	Acet-c	5 -3.3	5	5 -2.5	18	filtr.	1.962	1.774*
3	Bond	Acet-c	5 -6.7	5	5 -10	18	filtr.	2.028	1.701
4	Book	Acet-c	5 -3.3	5	5 -2.5	18	filtr.	1.044	0.833*
5	Book	HCl-c[2]	1 -2.5	2.5	5 -2.5	18	filtr.	1.390	0.977
6	Book	HCl-f	1 -2.5	2.5	5 -2.5	18	not filt.	1.160	0.724
7	Bond	HCl-f	1 -2.5	2.5	5 -10	18	not filt.	1.336	0.996
8	Bond	HCl-f	1 -2.5	2.5	5 -10	18	not filt.	1.400	1.014
9	Bond	HCl-f	1 -10	2.5	5 -10	18	not filt.	1.950	1.484
10	Bond	HCl-c	1 -2.5	2.5	5 -2.5	18	filtr.	2.072	1.846
11	Bond	HCl-c	1 -2.5	5	5 -2.5	18	filtr.	2.224	1.810
12	Bond	HCl-c	15 -.01	2.5	5 -10	18	not filt.	2.142	1.774*
13	Book	Acet-c	5 -3.3	5	5 -2.5	4	filtr.	0.800	0.579
14	Book	Acet-c	5 -6.7	5	5 -2.5	4	filtr.	0.898	0.615
15	Book	Acet-c	5 -3.3	5	5 -10	4	filtr.	1.038	0.796
16	Bond	Acet-c	5 -6.7	5	5 -10	18	not filt.	2.122	1.774*

*These values probably are nearest correct for the papers used.

[1]3.3N indicates the approximate normality of the regular laboratory dilute acetic acid while 2.5N indicates the approximate normality of the regular laboratory dilute hydrochloric acid.

[2]Acet-c indicates that acetic acid of the strength named was introduced into the extraction cup while HCl-f indicates that HCl of the strength named was introduced with the alcohol in the extraction flask.

DETAILS OF INVESTIGATION

Test Papers Used

Two types of paper were used for this work, though many of the details have been checked frequently on other papers in the course of routine laboratory work.

One paper used was a 75 per cent rag bond paper made under impure conditions so that it required heavy rosin sizing and considerable potato starch in the beater. The paper was surface sized with overcooked animal size. The extract showed considerable turbidity and had a heavy intermediate layer in the ether-water wash which could not be entirely dispelled with a concentrated salt solution.

The other paper used was an all wood-pulp book paper which had been aged purposely in ultra-violet light in order to bring about that more intimate combination of rosin and fiber debris which is typical of age deteriorated papers.

Extraction

The TAPPI method calls for twelve turnovers, but for some time the five-hour cook in the Underwriters' extraction apparatus has been in use in the Minor and other laboratories. The Bureau of Standards cooks at 15 siphonings per hour, but the Minor laboratory has considered 5 to 6 per hour ample to keep the paper continuously covered with hot extracting liquid and

safer than the faster cooking from possible bumping in the extraction flask.

It has been the custom in the Minor laboratory to use 50 cc. of alcohol in the flask and then to add directly to the cup from a pipette 5 cc. of 20 per cent acetic acid, thus using about the required total amount of acid, but giving a much stronger initial concentration on the paper for reaction with the combined rosin.

Even with this modification, the test bond paper, when extracted for 2½ hours, or 12 to 15 turnovers, was found to give low rosin percentage, and the extracted paper always showed a positive qualitative test for rosin.

Data in Table I, tests 1 and 2, show that when the time of extraction was lengthened to 5 hours, or 25 to 30 turnovers, the amount of rosin extracted increased by 0.15 to 0.20 per cent and this extracted paper gave a negative, qualitative test for remaining rosin.

In test 3, the acid of the cup was strengthened to double the amount originally used, also the acid of the wash was strengthened, but titration values show no apparent advantage, though the weight was increased by debris from the use of too strong acid.

In tests 4 and 5 for the aged book paper, extraction for 5 hours with normal acetic acid, or with the stronger HCl, gave complete extraction of the rosin, but the final alcoholic solution for test 5 was so dark in color that the end point of titration was obscured.

The suggestion of Sutermeister and Torrey in 1932 *(2)* that an acid stronger than acetic was needed to release the rosin was further developed by the Bureau of Standards in 1937 *(1)*, which substituted HCl for the H_2SO_4 of Sutermeister and Torrey.

When acetic acid is used with the test papers, the turbidity of the extract and the intermediate ether-water layer give considerable annoyance, even when a concentrated salt solution is used. When HCl is used for the extraction, the solids in the solvent are dense and settle easily to the bottom of the flask. A transparent solution remains and very little difficulty is experienced with the ether-water separation. Also, HCl is evaporated from the rosin more easily than is acetic acid. If the HCl is used too strongly, it tends to give a dark color to the extract which obscures the end point for titration and excess fiber debris increases the weight values.

In test 6 of Table I, the HCl was put in the flask with the alcohol and was practically of the strength recommended by the Bureau of Standards, but at the rate of heating for these papers, the amount of acid contacting the sizing was not sufficient to extract all of the rosin.

In tests 7 and 8, the wash acid was increased fourfold, and in test 9, the extraction acid also was increased fourfold. While the stronger acid increased the extraction efficiency, the titration values for all these samples with extraction acid in the flask only were low and all paper residues gave a decided test for unextracted rosin.

In tests 10 and 11 for bond and test 5 for book paper, the HCl was placed in the cup instead of in the flask and all of the rosin was extracted from the paper, but weight values are plainly quite high and the extract was so dark in color that titration values were high from obscure end point.

In test 12, in which 35 cc. of 0.01 normal alcoholic HCl was used in the flask and 15 cc. of the same in the cup, the work progressed satisfactorily; extraction was complete in two and one-half hours; the color of solution permitted accurate titration, and results checked closely with the best results obtained with acetic acid.

This acidified alcohol of 0.01 normality may be prepared conveniently by adding the equivalent of 1 cc. of concentrated HCl to each liter of alcohol of 95 per cent strength and it has a pH value of approximately 2.0.

From this work, it is the opinion of the authors that best results will be obtained when 50 cc. or more of 0.01 normal alcoholic HCl is used for the extraction, and, when assembling the equipment, enough of this acidified alcohol is added to the cup to cover the paper, the remainder being put in the flask.

Evaporation

The evaporation of the alcohol-acid extract in an open dish over a steam or boiling water bath was found to cause a loss of rosin, due to particles being mechanically carried out with the escaping solvent. This may be shown by placing a watch glass over such a dish to condense these vapors, then removing, drying and observing with a hand lens. Usually a thin rim of rosin will appear on the watch glass, too far removed from contact with the edge of the evaporating dish to have been caused by crawling up the sides of the dish.

Table II—Titration Factor for Rosin

No.	Weight Sample	Solvent Removal	Weight Recovered	NaOH used cc 0.1 N	Factor	Rosin by Titration	Remarks
1	0.1 g	none used		3.0	0.0333		Light colored, Freshly ground.
2	0.1	dist.	0.0999	3.0	0.0333	0.0999	
3	0.1	evap.	0.1010	2.8	0.0333	0.0932	
4	0.1	none used		2.95	0.0338		Light colored, Freshly ground.
5	0.1	dist.	0.1026	2.95	0.0338	0.997	
6	0.1	evap.	0.1002	2.65	0.0338	0.896	
7	0.1	none used		2.72	0.0368		Dark colored, Freshly ground.
8	0.1	dist.	0.1095	2.70	0.0368	0.0994	
9	0.1	evap.	0.1003	2.55	0.0368	0.0938	
10	0.1	none used		2.76	0.0362		Light colored, Stood one month after grinding.
11	0.1	none used		2.76	0.0362		
12	0.1	dist.	0.0998	2.62	0.0362	0.0948	
13	0.1	dist.	0.0962	2.61	0.0362	0.0945	
14	0.1	dist.	0.0991	2.62	0.0362	0.0948	

This loss through evaporation was further verified by distilling or evaporating 0.1 gram samples of rosin dissolved in alcohol and the results are given in Table II. In each case, three 0.1 gram samples of rosin were weighed out from the same lot.

For numbers 1, 4 and 7, the rosin was dissolved in 10 cc. of hot, neutral alcohol and titrated directly for the factor of that sample. For numbers 2, 5 and 8, the rosin was dissolved in 40 cc. of alcohol containing 2 cc. of 2.5 normal HCl in a weighed flask, distilled (using a Kjeldahl connecting trap), dried one hour at 100 deg. C., cooled, weighed, redissolved in 10 cc. of hot, neutral alcohol and titrated. Numbers 3, 6 and 9 also were dissolved in this acidified alcohol but in a weighed, open evaporating dish. Then the solution was evaporated over a boiling water bath, dried at 100 deg. C. for one hour, cooled, weighed, redissolved and titrated as before.

The tabulated results indicate a slight increase in the weight value, but this increase is due probably to added moisture which was not entirely removed by one-hour drying in the oven. The loss of rosin due to evaporating in an open dish, as shown by titration values, averages, for a 5 gram sample of paper, from 0.1 to 0.2 per cent on the weight of the paper.

It is believed that for accurate results the alcoholic extract of rosin should be distilled directly from the extraction flask using a connecting trap to prevent mechanical loss of rosin,

and that the extract should not be evaporated from an open dish.

Ether-Water Wash

The suggestion of the Bureau of Standards *(1)* that for control work the ether-water wash could be omitted was investigated on parallel runs made with and without the washing. In each of these cases, the filtration of the ether layer was maintained.

In Table III, numbers 1 to 6, inclusive, three such parallel sets of determinations using acetic acid are given, and the results indicate that for the unwashed samples the weight, as well as the titration values, is quite low since, under the conditions of cooking for these samples, considerable rosin remains attached to the layer which is filtered out and cannot be washed from the residue with ether. When the extract is washed with water-ether-acid, this rosin complex is more or less broken, giving the higher extraction values.

In tests 7 to 12 inclusive, where the extraction is done with strong HCl, this complex is quite well broken and the unwashed samples titrate actually higher than do the washed ones. This increase may be due to the alum of the furnish and, if reasonably constant, might be included in the calculations. However, the strong acid developed a deep color in the solutions which obscured the end point of the titration, and the results may be too high.

For control work, this short method of eliminating the water wash has much to recommend it; but for research work or for such samples as may contain some blended sizing instead of pure rosin, it would seem necessary to retain the water wash.

It has been the custom of the authors, after evaporating the alcohol-acid extract to complete dryness, to transfer the first ether washing to the separatory funnel, then to wash the dish in dilute HCl following that with a water wash. This acid wash loosens the impurities from the dish walls and then they are removed easily by a rubber policeman in the water solvent.

From the data of Table I, it would appear that this wash acid not only aided in completing the transfer to the separatory funnel, but it also facilitated the release of the rosin from its chemical combination with the contaminating material.

Tests 5 and 6 (Table III), give the most marked evidence of the effect of rosin being lost in the discarded filtrate when the chemical combination of rosin and cellulose residues was not entirely destroyed in the extraction. When the extract is washed with water and HCl, the rosin apparently is removed completely, whereas, when this acidified washing is omitted, most of the rosin is filtered out with the debris, and scarcely 20 per cent of it remains for titration.

If the ether layer is not given sufficient time to completely separate itself from the water, considerable rosin may be lost.

The data in tests 4, 13 and 14 (Table I), show that, even when the acid of the extraction is strengthened as in 14 over 13, the loss for a mere four-hour time of standing in the separatory funnel is still apparent and may amount to as much as 0.2 to 0.25 per cent on the weight of the paper.

In test 15, the strengthening of the acid of the wash was more effective than the strengthening of the extraction acid as in 14.

It would seem, therefore, that for accuracy the ether-water-acid solution should always stand in the separatory funnel over night before drawing off, preferably in the second washing water.

When an intermediate layer of foreign material floats between the ether and water layers, various expedients have been tried, including salting out, filtering, etc. In most cases, salt is very efficient in dissipating the layer; though, with this particular bond paper, its efficiency was very low. Also there is the danger of retaining an appreciable amount of salt to be weighed with the final product. Even after thorough washing with clear water, it is possible to obtain with nitric acid and silver nitrate on the dried product, a strong test for chlorides.

This intermediate layer may be filtered out conveniently by placing in the neck of the weighed flask a small, short-stemmed funnel in which has been placed an open mesh filter paper of such size that it reaches about half way up the side of the funnel. After drawing the water layer from the separatory funnel to the intermediate layer, the filter paper in the funnel is filled with clean ether which is followed quickly with the rosin-ether solution from the separatory funnel. The ether in the pores of the paper prevents the water from filtering through and the ether-rosin solution filters too rapidly for appreciable crawling up the sides of the funnel. Then the whole is washed with clean ether to remove adhering rosin.

The mass of debris in the funnel, when dried, frequently gives a qualitative test for rosin, indicating that such rosin was chemically combined and not available to the wash ether. For this reason, in the original method using acetic acid, with which the rosin was not freed completely truer results were obtained without recourse to filtration; for the weight of the debris is small, while the rosin combined with it to be filtered out might be quite appreciable. On samples on which the acid of the extraction was strong enough to free all of the rosin, filtration gives a more accurate weight value.

In Table I, tests 2 and 16, for bond paper, illustrate this point; for the weight value is brought 0.16 per cent nearer to the titration value because of filtering out of the foreign matter while the titration values with and without filtration exactly agree.

Table III—Washing of the Rosin Extract of Paper

No.	Type of Paper	Extraction Kind	Acid Amount	Extr. Hours	Washing HCl Used	Washing Hours	Purification	Rosin by Weight	Rosin by Titration
1	Bond	Acet-c[1]	5cc-3.3N[2]	2.5	5cc-2.5N	18	filtr.	1.764%	1.629%
2	Bond	Acet-c	5 -3.3	2.5	no wash		filtr.	1.468	1.195
3	Bond	Acet-c	5 -3.3	5	5 -2.5	18	filtr.	1.962	1.774*
4	Bond	Acet-c	5 -3.3	5	no wash		filtr.	1.468	1.195
5	Book	Acet-c	5 -3.3	5	5 -2.5	18	filtr.	1.044	0.833*
6	Book	Acet-c	5 -3.3	5	no wash		filtr.	0.434	0.181
7	Bond	HCl-c	1 -2.5	2.5	5 -2.5	18	filtr.	2.072	1.846
8	Bond	HCl-c	1 -2.5	2.5	no wash		filtr.	2.090	2.027
9	Bond	HCl-c	1 -2.5	5	5 -2.5	18	filtr.	2.024	1.810
10	Bond	HCl-c	1 -2.5	5	no wash		filtr.	2.070	1.919
11	Book	HCl-c	1 -2.5	2.5	5 -2.5	18	filtr.	1.390	0.977
12	Book	HCl-c	1 -2.5	2.5	no wash		filtr.	1.344	1.050

*These values are probably nearest correct for the papers used.

[1]Acet-c indicates that acetic acid of the strength named was introduced into the extraction cup.

[2]3.3N indicates the approximate normality of the regular laboratory dilute acetic acid while 2.5N indicates the approximate normality of the regular dilute hydrochloric acid.

Drying of Sample

The time of drying the rosin extract, as practiced in the various laboratories, seems to vary from one hour to over night. Sutermeister and Torrey gave data which showed that with one hour drying, using widely varied amounts of powdered rosin, there was a fairly constant loss due to drying of approximately 0.004 grams. The author dissolved 0.1 gram samples of rosin in ether and evaporated to simulate the conditions of a normal test sample and found that the loss in weight was always more with freshly ground samples and with light colored rosin than with older samples or with dark rosin, but in all cases it did not exceed appreciably the amounts recorded by Sutermeister and Torrey.

When the time of drying was increased up to nine hours, the loss in weight, which at one hour was 0.0042 grams, increased to 0.0053 grams, indicating that for weight values longer drying will not affect results materially. But when the sample is to be titrated, the length of time in the oven is important. For the average sample, after drying for one hour, the conversion factor required was 0.0362; but after drying for nine hours, for the same conversion to original rosin, a factor of 0.0414 was required, and this calculates to a loss of 0.0058 grams more rosin lost after nine hours drying than after one hour drying.

It was shown in Table II, however, that when these 0.1 gram samples of rosin were dissolved in hot alcohol and acid, evaporated or distilled, taken up in ether-water-acid, distilled and dried in the oven, the recovered rosin almost invariably weighed more than the original sample. This suggests that, under such conditions as are normal for the test, it is not easy to drive out all of the acid and moisture, and the weight of such residual moisture will be added to that caused by impurities from paper and sizing which are not removed in the process to vitiate the weight results.

It would seem that, since this residual moisture does not affect titration values and since long drying does bring other complications, the time of drying should be standardized for the most satisfactory results at from one to two hours at 100 to 105 deg. C.

Titration Factor

One cc. of 0.1 normal NaOH will neutralize exactly 0.0346 grams of pure abietic acid, but the exact conversion factor for commercial rosin must be determined by experiment.

In Table II, tests 1, 4 and 7, show that when 0.1 gram samples of freshly ground rosin are dissolved in hot neutral alcohol and titrated, the conversion factor varies from 0.0333 for the very light colored samples, to 0.0387 for the very dark colored samples. Tests 10 and 11 indicate that finely divided samples which have stood exposed to the air for a month or more, when dissolved in alcohol and titrated, give a constant factor of 0.0362; but when, as in tests 12, 13 and 14, such samples are dissolved in acidified alcohol, distilled, redissolved, dried one hour, weighed, redissolved and titrated, and the factor 0.0362 is used, the amount of recovered rosin shown by weight is slightly high through retained moisture while that from titration shows a constant loss of approximately 0.005 grams.

This constant loss from drying seems to be consistent with the findings of Sutermeister and Torrey who oven-dried without first introducing moisture into the melted sample and found a fairly constant loss of approximately 0.004 grams, even when the amount of sample varied widely. Such constancy of loss due to oven-drying suggests its relation to surface exposure rather than to volume. For the rosin of a 5-gram sample of paper, this drying loss would amount to about 0.1 per cent on the weight of the paper.

It would seem, therefore, that rosin which has been through the mill process of paper incorporation and subsequent extraction probably would respond to a factor of 0.0362, but if the extracted rosin is dried in an oven at 100 to 105 deg. Fahr. for one hour, 0.005 grams should be added to the weight calculated from the titration value, before calculating the percentage ratio on the weight of the paper.

SUMMARY

In the foregoing, an effort has been made to develop evidence for using the following method for the extraction of rosin from paper:

A 5-gram sample of paper is fluted or cut into narrow strips of such a length that the paper fits into the cup of an Underwriters Extraction apparatus without undue crowding and that the ends are well covered with extracting liquid before siphoning. The extraction acid is made up by adding the equivalent of 1 cc. of concentrated HCl to each liter of 95 per cent alcohol.

About 15 cc. of the extraction liquid is put into the cup and 35 cc. or more in the extraction flask. The heating is applied so that the liquid siphons over 5 or 6 times per hour and heating is continued for a minimum of 2½ hours.

After extraction (except in the case of routine-type papers), a small portion of the extracted paper is removed and qualitatively tested for rosin by placing in a watch glass and sprinkling over it a few grains of cane sugar followed by two drops of concentrated sulphuric acid. Any raspberry red color developing is indicative of rosin which has not been extracted. When such a positive test for rosin is obtained, the cooking must be continued until the test indicates complete extraction.

Then the alcoholic extract is distilled directly from the extraction flask, using a Kjeldahl connecting bulb and a condenser, after which the dry extract is transferred with ether to a separatory funnel containing water. The flask next is washed in water containing 5 cc. of dilute HCl, and, after transferring this solution to the separatory funnel, it is washed again in water alone. At this stage, a rubber policeman is quite efficient in removing adhering material from the walls of the flask. After the water washing, more ether is used and water is added until the funnel contains about 40 cc. of ether and 100 cc. of water.

After the two layers of water and ether have separated clearly, the water layer is drawn off into a second separatory funnel. Fresh water is put with the remaining ether and about 20 cc. of fresh ether is shaken with the wash water in the second funnel. This water should be washed a second time with ether and both ether washings are added to the ether solution in the first funnel. At a convenient stage, this ether-water mixture should be allowed to stand overnight for the most complete separation of the rosin from the water layer.

When an intermediate layer of foreign material floats between the ether and water layers, often, it may be dissipated by the addition of a saturated salt solution but in that case care must be taken to wash out all of the salt with clean water.

This intermediate layer also may be filtered out when transferring to the weighed flask by pouring through a short-stemmed funnel fitted into the neck of the weighed flask and containing an open mesh filter paper of such size that there is a wide margin of glass wall for crawling. The pores of the filter paper should be filled with ether just prior to adding the rosin solution. This insures the retention of the water debris layer in the funnel while the rosin adhering may be washed out with fresh ether.

If the cooking has been insufficiently drastic for the complete removal of all the rosin from chemical combination, rosin may be lost in this debris layer when it is filtered out.

After distilling off the ether, the weighed flask is dried in an oven at 100 to 105 deg. C. for one hour, cooled in a desiccator and weighed. From this value the percentage of rosin in the paper by weight may be calculated.

After weighing, the extract is covered with 10 cc. of neutral alcohol, warmed for complete solution and titrated with 0.1 normal NaOH using phenolphthalein as indicator. Each cc. of NaOH consumed is assumed to be equivalent to 0.0362 grams of rosin. To the amount of rosin thus calculated there is added 0.005 grams for the average weight lost by evaporation or polymerization during drying of sample. From the total weight of rosin thus found, its percentage relation to the paper sample is calculated.

If there is a wide difference between the amounts found by weight and by titration, there is either considerable fiber debris in the weighed sample or foreign sizing material blended with the rosin. Any appreciable amount of wax usually is apparent by its insolubility in the cold alcohol solution and it often may be identified by filtration at this point. Oils and greases are apt to give a soft, sticky extract as contrasted with the hard, glassy surface of pure rosin. Stearic acid may be identified by filtration from the alcoholic solution and examination of crystal structure under the microscope.

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Spraying Insulating Board *with Refined Pulp*

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PERHAPS the most evident reason for applying a special surface to insulating board would be to improve its appearance. Most insulating boards are made from pulp which has not been highly refined, hence they may be dark in color as well as somewhat coarse in structure. While from the practical standpoint, for uses such as plaster base, sheathing material or roof insulation, the appearance of the board is of little consequence, from the sales standpoint, it may be a matter of considerable interest since the average purchaser associates appearance with quality. Instead of attempting to educate the public to the idea that a relatively rough surface should be better both as a plaster base and (from the insulating standpoint) as a sheathing material, it is perhaps easier to produce a board which has greater sales appeal because of improved appearance.

Since ordinary insulating board pulp does not bleach readily, and since the nature of the board makes it desirable to keep the pulp rather coarse, it may be practical to secure the improved appearance which is wanted by coating the surface with a more highly refined pulp. For example, the application of a refined bleached paper pulp should make possible a smooth surfaced board of any desired color while still retaining as a base the original low cost, efficient board pulp. Likewise, the application of a highly sized pulp to the surface might be desirable to reduce the absorption of either moisture or paint. The matter of moisture absorption is becoming of increasing importance because of the extensive use of insulating board in the walls of houses which are air-conditioned. Because of the higher humidities maintained in such houses there is always the possibility for considerable condensation of water vapor to liquid water between the inner and outer walls. Since there also is a demand for fire-resistant boards, a highly fireproof pulp (such as asbestos) might be added to the surface to increase fire resistance.

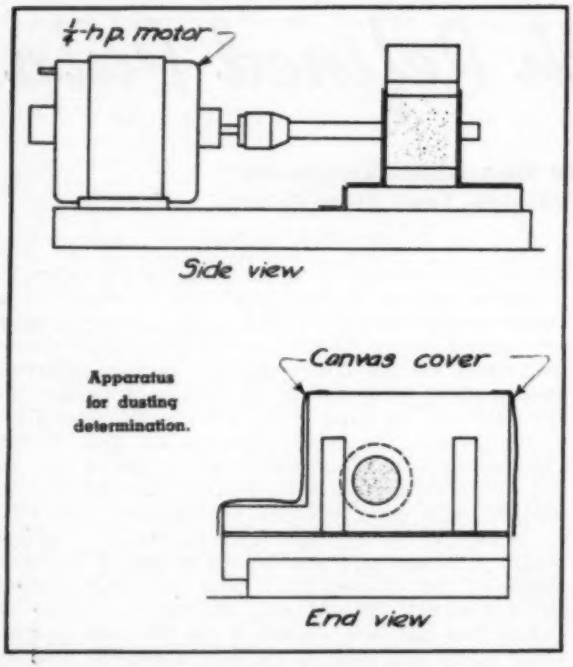
Another property of board which may be affected by a surface coating is strength. While a thin coating of even high strength pulp on the surface of the board cannot greatly affect tensile strength, it may materially affect the transverse breaking strength expressed as the modulus of rupture. In this latter case, the board acts as a beam—the outer fibers on the lower surface being in tension and those on the upper surface being in compression with a position near the center where theoretically no stress occurs. Since the breaking strength, under these conditions, is determined largely by the strength of the outer fibers, the addition of a surface coating of stronger pulp increases the strength of the board materially. For example, boards were made from mechanical (uncooked) cornstalk pulp on which a coating of cooked pulp had been applied in the formation process. Other boards were made of the same mechanical pulp by the same procedure except that the surface coating was omitted. The coated boards averaged a modulus of rupture of 700 pounds per square inch as compared with 548 pounds for the unsurfaced boards. A steamed pulp (from cornstalks boiled in water at atmospheric pressure) board surfaced with cooked pulp tested 1,004 pounds.

The air infiltration through insulating board is reduced to practically nothing by applying a surface coating of paper to the board. To demonstrate this fact, two pieces were cut from adjacent parts of an insulating board. One board was coated by spraying with paper pulp; the other was untreated. Air pressure was applied to one side of the board and the amount of air passing through determined *(1, 2)*. The untreated board showed an infiltration of 12 cubic feet of air per square foot per hour under a pressure difference equivalent to one inch of water. The coated board showed no

infiltration under 6.0 inches of water pressure (equivalent to a wind velocity of about 112 miles an hour). On the other hand, paper surfacings on board to be used for acoustical purposes are a disadvantage as they reduce sound absorption. For example, a board from cornstalk pulp, which had an average coefficient of sound absorption for frequencies from 128 to 2,048 cycles per sound of 52.0 per cent, was sprayed with paper pulp. The addition of the paper coating reduced the coefficient of absorption to 37.5 per cent. If, however, such a board were provided with holes or grooves in the surface, the sound absorption would be increased.

The relatively coarse and not highly refined pulp frequently used in insulating boards sometimes results in considerable "dusting" (that is, the breaking off of fine particles during handling). This dusting may be reduced by a surface of more highly refined pulp. For example, spraying insulating board with paper pulp reduced the amount of dusting removed in 20 seconds of brushing from 15.5 ounces to 2.9 ounces per 1,000 square feet. In a second 20 second brushing, the untreated board lost 10.1 ounces compared to 3.1 ounces per 1,000 square feet for treated board. Additional data on the effect of a paper coating upon dusting is given in the accompanying table.

The dusting data quoted was determined by brushing a sample 4 inches by 3 inches in the apparatus illustrated and



Apparatus for dusting determination.

for the time indicated in the table. This apparatus consisted of a revolving bristle brush (a bottle cleaning brush made for dairy work) driven by an electric motor at 1,750 r.p.m. The brush was enclosed in a sheet metal housing to retain the dust. The sample was slid under the brush and the brush adjusted so that the bristles just touched the surface. The board then was raised ⅛ inch by shimming up the support under it. It next was moved slowly back and forth under the brush at a uniform rate for the desired time interval; then weighed and the loss in weight determined. The loss in weight then was calculated to a basis of ounces per 1,000 square feet.

Several methods of applying a surface coating are possible. When forming boards on the forming machine previously described (3), a surface coating was applied to the top surface by floating it onto the unpressed board mat from an auxiliary head box. The head box used was a rectangular wooden box about 8 inches by 8 inches by 26 inches with an open top. One side was 3 inches lower than the other side so that the pulp could spill over onto a slanting board down to the mat on the forming machine. The pulp was fed into the head box from a steel drum suspended above the forming machine and equipped with an agitator for keeping the pulp in suspension. It was run out of the bottom of the drum through a 2-inch pipe to a horizontal distributing pipe with several outlets just over the head box. This auxiliary head box was set as close as possible to the surface of the mat on the machine so as to drop the pulp the minimum distance necessary from the spillway to the mat surface. It was set about half way between the ends of the suction box, the exact position depending upon the freeness of the basic pulp being used. If the pulp for the surface layer were applied too close to the dry end the pulp failed to bond properly. If applied too close to the wet end, there was an undesirable amount of mixing of the two pulps. When located in the proper position, excellent results were secured.

Reduction of Dusting of Cornstalk Insulating Board Because of Spraying with Paper Pulp

No.	Surface Tested	Weight of dust in ounces per 1000 square feet			
		1st 20 seconds	2nd 20 seconds	3rd 20 seconds	Total 60 seconds
1	Top	1.95	0.68	1.02	3.65
	Bottom	1.10	1.02	0.85	2.97
2	Top	2.29	1.35	1.78	5.42
	Bottom	1.27	1.39	1.61	4.27
3	Top	7.70	4.15	4.57	16.42
	Bottom	18.78	11.91	7.70	38.39

No. 1—Sprayed on both sides with paper pulp before drying but after pressing. Top wire 14-mesh Standard paper wire; bottom 10-mesh spiral weave.
No. 2—Sprayed before pressing.
No. 3—Not sprayed.

Sheets of newsprint were applied to the board by laying wet newsprint (old newspaper wetted with water) upon the wet mat just as it entered the press rolls. While the resulting boards had a good appearance, there was some tendency for the paper to peel off. If a wet sheet of paper direct from the forming machine could be run onto the board, it would doubtless adhere better.

Another method of applying a surface coating was by spraying the pulp on with an ordinary paint sprayer by means of compressed air. The wet mat about to enter the press rolls, the wet boards from the press rolls, and the dry board were sprayed in this manner. The paper pulp bonded somewhat better to the wet than the dry board.

In conclusion it may be summarized that experimental work has indicated that surfacing insulating board with more highly hydrated pulp may: (1) increase the modulus of rupture, (2) improve appearance, (3) reduce air infiltration, (4) reduce sound absorption, and (5) reduce dusting. Surface coatings have been applied by means of an auxiliary head box and a sprayer.

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The work reported in this article is a part of the regular Station project on the production of insulating board from cornstalks.—*Author's Note.*

Modernization of
Soda Pulp Mills

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IN a modern soda pulp mill the equipment and processes used are generally the same as those in a modern sulphate mill. Such a plant can accommodate itself to a variety of woods as raw material and to the types and quality of pulps obtained.

The usual thought in connection with soda pulp is a short fibered filler stock made from poplar wood. However, a long fibered pulp of good strength and bleachability can be produced by using other woods. It is possible, therefore, for a mill making "book" grades of paper to provide itself with the grades of pulp required in a single flexible pulp mill. Such a set-up, however, requires special consideration of the screening system and multi-stage bleaching.

Wood Preparing and Handling

To obtain a uniform quality of pulp, it is desirable to have wood of uniform moisture content. To properly dry the wood and reduce decay to a minimum, the wood yard should be laid out so the wood can be tiered and the piles readily reclaimed. The use of wood grapples and portable conveyors in conjunction with the main conveyors of fixed location is perhaps the cheapest way of storing and reclaiming the wood. Wood can be piled more cheaply than tiered and, under certain conditions, is the proper method.

If rough wood is received, it should be barked and stored before using. To insure cleanliness, all wood should be washed through drums or by high pressure showers before going to the chippers. With the latter arrangement, a "hot pond" can be used to good advantage, allowing a soaking period to loosen dirt and providing storage to insure uninterrupted operation of the chippers. A propeller is a good method of obtaining circulation in the pond and its use reduces the amount of manual labor required to feed the jack ladder. The short time the wood is in the hot pond does not materially affect the moisture content.

On the layout of the wood room equipment depends the production of uniform, clean chips at low power and labor cost. To fill these requirements, the chippers should be crowded to capacity and the knives kept sharp and properly set. The amount of sawdust can be reduced by changing the knives frequently. A rubber belt sorting conveyor can be used to feed the chippers. End feed reduces manual work to a minimum.

The speed of the chipper is an important factor in rate of production, uniformity of chips and amount of sawdust produced. It is good practice to slow it down as much as possible. To get uniform chips, the feed chute should be long and full of wood so that pressure is applied against each stick being chipped.

Less space is required to remove sawdust and large chips with the modern vibrating type screen than with the older types of screens. Oversized chips go to a crusher or rechipper and are returned to the screen. The capacity of a modern screen is about 1 cord (128 cu. ft. basis) per hour to each 4 sq. ft. of chip screen area.

The sawdust is collected in a hopper below the screen installation and blown or conveyed away, depending on conditions. A simple tilting device may be employed to measure and record the amount of sawdust. By this means, a proper check can be obtained on operations.

The main concern with the vibrating type screen is the bearings which are subjected to a severe load condition. Replacements must be anticipated; but this disadvantage, in general, is offset by the advantages gained. No operation attention is required except to clean the screening surfaces occasionally, particularly the sawdust screen, which fills up with "toothpicks".

The chips may be stored above the digesters. Another method offering many advantages is "ground" storage. One of these advantages is that any digester may be filled with any variety of wood, independent of storage considerations over that particular digester. Ground storage bins are equipped with automatic feeders to control the quantity and digesters may be filled just as fast as with over-head bins.

Arching of chips in bins can be overcome by vibrators so that all operations may be controlled from the digester house charging floor.

A chip weightometer is a refinement to record weight of wood to the digester and samples of chips are taken to determine the percentage of moisture. By measuring the pulp produced, a quite accurate record of yield is obtained.

Samples of chips should be taken periodically to determine uniformity of size and percentage of sawdust remaining.

Therefore, the demand for uniform pulp quality goes back to the wood preparing plant and depends on uniformly dry wood, well screened chips and properly cleaned wood.

Low cost operation depends on a high and uninterrupted feed to the chippers, and on proper mechanical equipment so arranged that manual labor is at a minimum.

Belt conveyors and elevators are generally the most economical for handling chips. A most satisfactory drive is by chain from head shaft direct to a gear-motor unit. All conveyors may be operated from the most convenient point by push button control.

Digester House

The digester house might be called the heart of the pulp mill. Quality production is simplified by automatic control equipment and forced circulation in the digesters.

There should be at least three digesters to reduce the peak demands on the boiler house. They should be of welded construction, heat treated and the only limit on size is that of shipping and shop facilities. Some prefer a dished bottom with inner perforated cone, but good results are obtained

with just a cone bottom. Clean blows are assured with a 90-degree cone when the blow line is short.

The capacity of a digester may be increased 15 per cent to 20 per cent by a suitable chip packing device.

Indirect heating is desirable, one advantage being, the condensate is returned to the boilers, thus reducing the amount of make-up and feed water treatment; another, the liquor in the digester is maintained at a higher Baumé, requiring less steam later in the evaporation. The increased Baumé is between 1 and 2 degrees. The forced circulation of liquor in a digester also gives a more uniform temperature throughout the charge and means a more uniformly cooked pulp. Indirect cooking should shorten the cycle due to greater liquor concentration and forced circulation.

These aids also have their disadvantages, due to the increased equipment and power involved. A conductivity recorder is essential to warn of any leakage of caustic into the condensate being returned to the boilers. The cooking liquor must be free of lime to prevent tubes in heaters from getting coated. It is difficult to keep circulating pumps packed, due to the high pressure and temperature at which they are operating. For these and other reasons, a careful selection of equipment is necessary to get worth-while results. Each heater must have a trap and it should have ample capacity to handle the peak condensate rate.

The caustic cooking liquor has little or no action on steel. Copper bearing metals are attacked. The liquor is an excellent electrolyte and metals of different electrical valence should not be used near one another as pitting and corrosion will result. This is important in connection with blow valves and a common source of trouble. Stainless steel parts are commonly used.

Steam flow meters and recording temperature and pressure gauges are desirable aids to control. The automatic control of cooking also is available.

The "relief" from the digesters may be used indirectly to heat cooking liquor. When coniferous woods are used, a condenser may be used to collect turpentine.

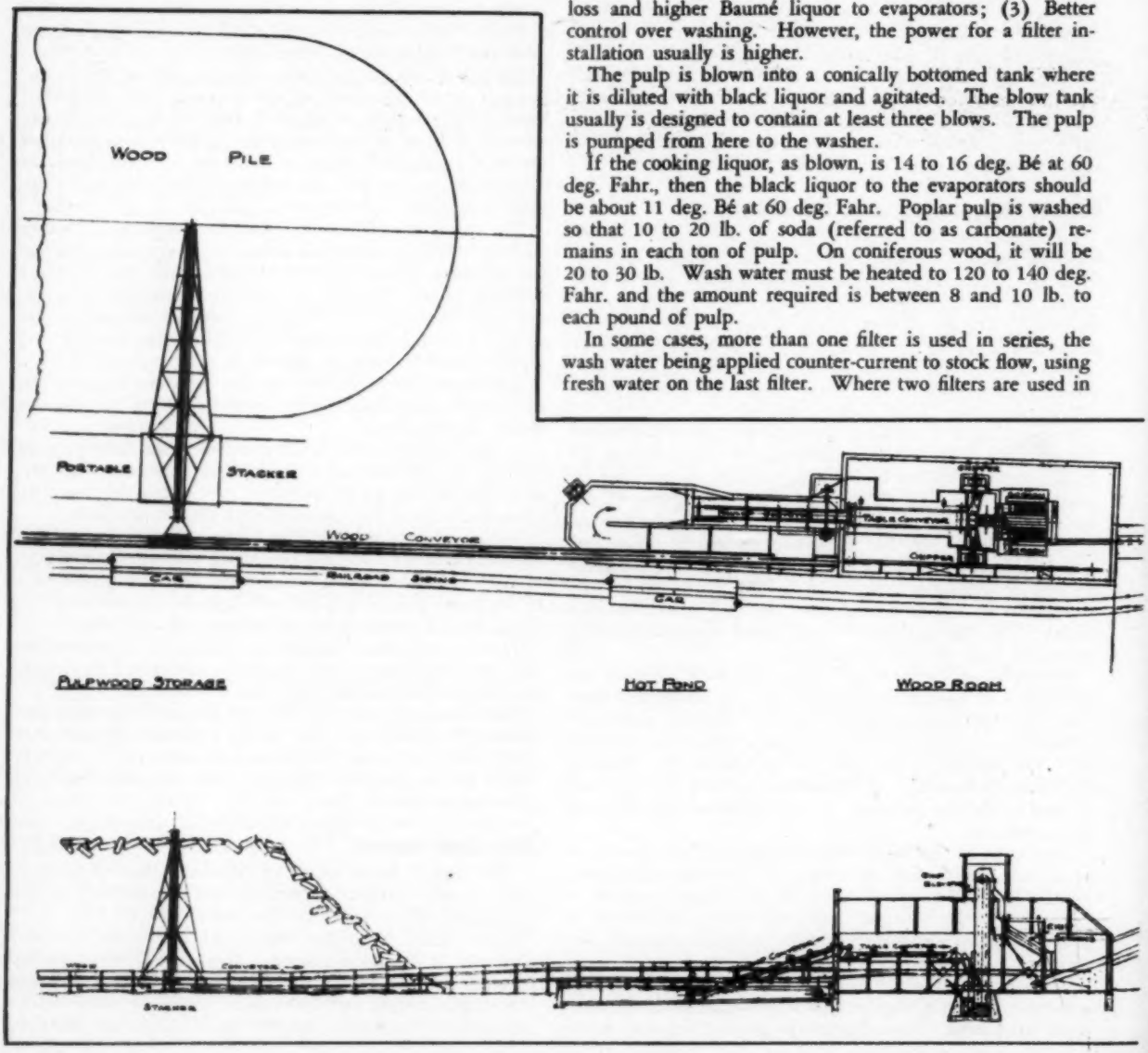
Brown Stock Washing

The older systems of pulp washing use wash pans or diffusers in which to wash the pulp. These systems are gradually being superseded by continuous washing over vacuum filters. The main reasons in favor of the vacuum filters are: (1) Less space and labor; (2) Lower chemical loss and higher Baumé liquor to evaporators; (3) Better control over washing. However, the power for a filter installation usually is higher.

The pulp is blown into a conically bottomed tank where it is diluted with black liquor and agitated. The blow tank usually is designed to contain at least three blows. The pulp is pumped from here to the washer.

If the cooking liquor, as blown, is 14 to 16 deg. Bé at 60 deg. Fahr., then the black liquor to the evaporators should be about 11 deg. Bé at 60 deg. Fahr. Poplar pulp is washed so that 10 to 20 lb. of soda (referred to as carbonate) remains in each ton of pulp. On coniferous wood, it will be 20 to 30 lb. Wash water must be heated to 120 to 140 deg. Fahr. and the amount required is between 8 and 10 lb. to each pound of pulp.

In some cases, more than one filter is used in series, the wash water being applied counter-current to stock flow, using fresh water on the last filter. Where two filters are used in



series, under the above conditions, the Baumé of liquor to evaporators should be increased 1 to 2 degrees. A two-stage system, under these conditions, not only will reduce the amount of wash water used, but also will reduce somewhat the soda loss. A three-stage vacuum system on sulphate pulp is in operation and is said to be giving good results.

There are qualifications to the statement that vacuum filters will give lower chemical loss and higher Baumé liquor to the evaporators. With ample pan or diffuser capacity and proper control of washing, equal or better results than with single stage washing have been obtained.

With washers, difficulties from black liquor foaming can be eliminated by properly designing the system.

Ample storage of black liquor ahead of the evaporators is important.

The pulp leaving the washer preferably should be re-washed over a vacuum filter before going to the screening system, in order to eliminate foaming and to reduce bleach consumption. In some cases, this washing is done after screening.

The vapor released from the blow tank passes through a cyclone separator to remove entrained particles of pulp, and then goes to atmosphere or to a heat reclaiming system.

Digester Heat Recovery System

The blow vapor is at approximately 212 deg. Fahr. If the digester is blown at 75 lb. pressure, the amount of heat released in the form of vapor per ton of pulp is about 2,250,000 B.t.u. This is a considerable item and can be recovered by condensing the vapor, the heat being transferred to water. If jet condensers are used, the water is contaminated slightly. If such contamination is objectionable, the water is passed through heat interchangers, wherein fresh water is heated. Another method is to use a surface condenser.

Another advantage in condensing the vapor is reduction of odors from the mill.

Screening System

Knotters followed by flat screens will give the cleanest pulp. For various reasons rotary screens are sometimes employed, in which case the pulp should be rescreened after bleaching.

Inasmuch as poplar and coniferous pulps screen differently, separate centrifugal screens for each, with the proper size perforations, are required.

Bleaching

A three or four-stage bleaching system is desired when coniferous pulp is to be bleached to a high color and strength. This system would consist of chlorination, caustic extraction and one or two stages of hypochlorite bleaching.

Poplar pulp also can be treated advantageously in such a system.

Chlorination can be carried on at 3½ to 4½ per cent consistency and caustic extraction at 12 to 15 per cent. The consistency for the final stage or stages depends upon the system employed and other considerations.

Preferably, pulp is washed on vacuum filters after each stage. When the pulp is not neutralized after chlorination, a rubber covered filter with stainless steel wire cloth cover is needed. The same construction may be used after caustic extraction, although a cast iron unit is satisfactory.

The pulp must be well washed. This requires a large volume of water. In some cases, when the supply is limited, counter-flow re-use of wash water is utilized. Such re-use of the water in some instances has reduced the requirement from 80,000 gal. per ton to 20,000 gal. per ton.

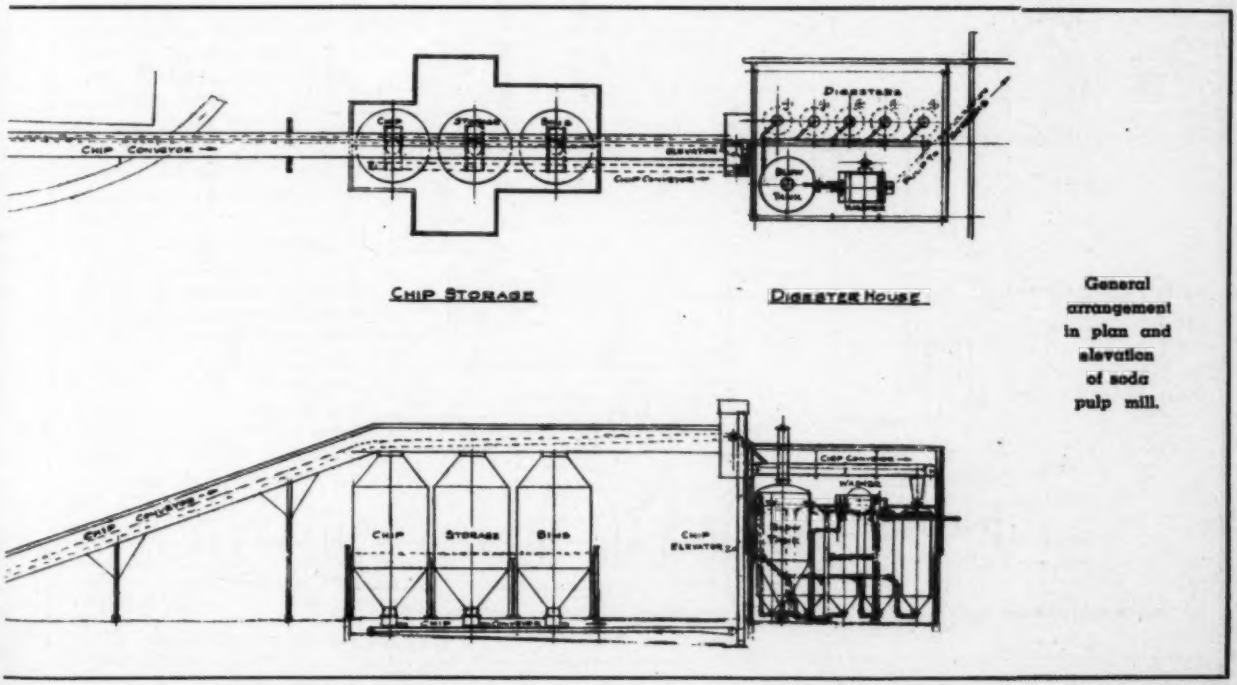
In a modern bleaching system, labor is reduced by handling most operations through remote control. Operations are checked and controlled to obtain the desired bleaching characteristics.

Evaporator Room and Recovery System

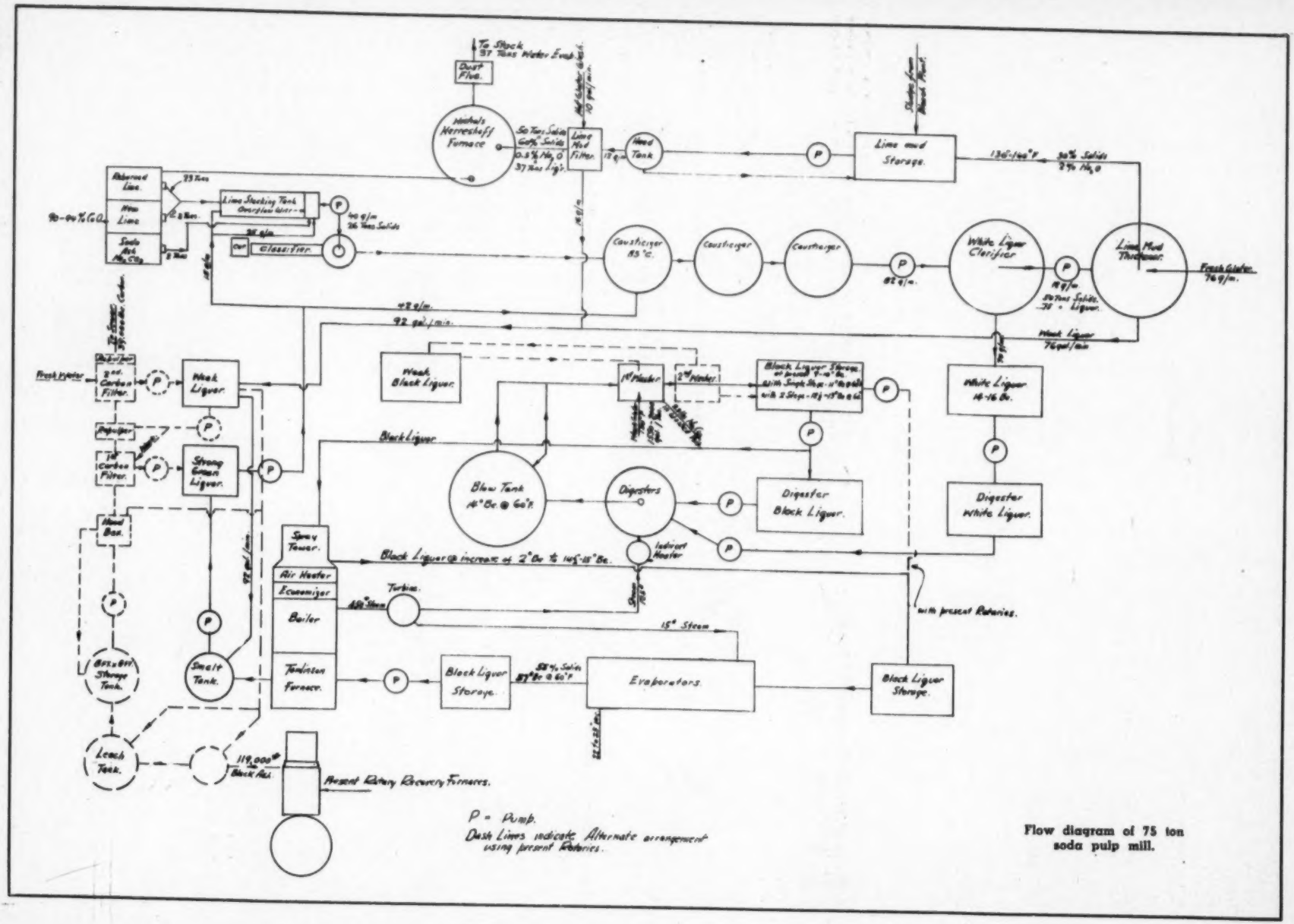
The modern multi-effect evaporator will evaporate 3 to 4 lb. of water per pound of steam and is of the same construction as the evaporator used in sulphate pulp mills.

With vacuum washers in use, it is not necessary to filter the black liquor to remove pulp fibers, as is commonly done where wash pans are in service.

In the old rotary recovery units, the chemicals are recovered in the form of black ash. This ash is either put in



General arrangement in plan and elevation of soda pulp mill.



Flow diagram of 75 ton soda pulp mill.

leaching cells or over vacuum filters to remove the free carbon. (In some instances this by-product is further treated to produce what is known as "activated carbon.")

The waste heat from the rotaries is usually used to produce steam.

In the modern spray type recovery unit, the carbon is burned off producing more steam. Also, due to efficient design in which preheaters and liquor spray chambers are incorporated, the flue gases are reduced to a low temperature. Some soda, in a very finely divided state, escapes in the flue gases. The Cottrell Precipitator has been used to advantage in reclaiming most of it. As the wet type is subject to severe corrosion where sulphur is present, the dry type is desirable.

Causticizing

The smelt from the recovery unit goes to a dissolving tank from whence the "green" liquor is supplied the causticizing system which may be of either the batch or continuous type. Modern practice inclines toward the latter. In this case a continuous stream of milk-of-lime enters the causticizers and the principal reaction takes place in changing sodium carbonate to caustic soda. "White" liquor is decanted off and the lime mud is washed in counter-current fashion.

Lime Reburning

When lime costs over $8.00 to $10.00 per ton, it is economical to reburn the lime sludge from the causticizing system. Another consideration is whether suitable means are available for disposing of the sludge. If the lime is reburned, the procedure is to give the sludge a final wash and thickening on a vacuum filter (or two in series) and then burn. There are two general types of units—the horizontal rotary and the vertical with revolving rakes. The latter has been introduced recently in several kraft mills.

An attempt has been made to point out briefly that a modern soda pulp mill can be used to produce a variety of pulps from a wide range of woods and, in general, the equipment is the same as that used in a modern sulphate mill.

A plant can be changed readily to either system as policy demands.

Testing Samples

of Molded Wood or Fiber Products

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IN a study of the coalescence and plasticization of wood particles or fibers, it is essential that the physical properties of the molded or formed products be accurately evaluated. When the effects of a wide range of conditions on the properties of such materials are investigated, it is necessary to use equipment of a size convenient for handling and economical of materials and time. It is desirable, therefore, in experimental work of this nature, to apply various physical tests to relatively small samples.

In an investigation in the Idaho University's laboratory of the coalescence and plasticization of wood, it was necessary to make hundreds of samples under various conditions. For this work, a circular mold making a sample 2¼ inches in diameter was found to be convenient. Determination of the breaking strength and stiffness of test strips cut from these small disks required very sensitive and accurate measurement. A static bending apparatus was designed which proved satisfactory. A suitable instrument for measuring hardness was also devised.

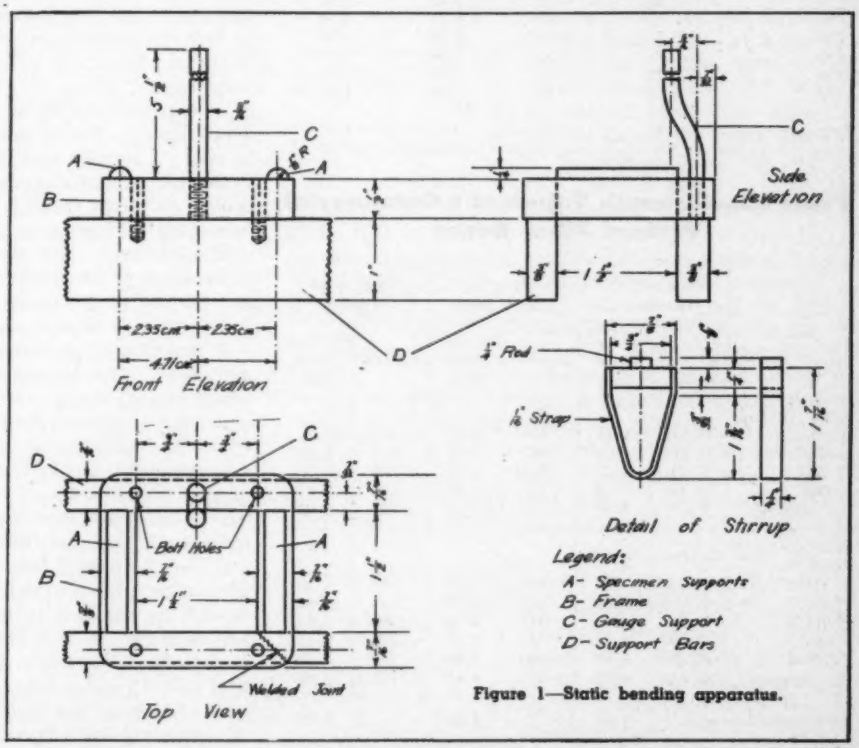

Figure 1—Static bending apparatus.

(*) Since this article was prepared, Dr. Jahn has been appointed professor in the Pulp and Paper Department, New York State College of Forestry, Syracuse, N. Y., and is now installed in his new position.—*Editor's Note.*

Table I—Reproducibility of Measurement of Modulus of Elasticity of Cold-Rolled Steel Bars

Sample	Test	Modulus of Elasticity x10⁶ kg/cm²	Per Cent Deviation from Average
15S	A	1.94	0.51
	B	1.96	0.51
	C	1.96	0.51
	D	1.94	0.51
	Ave.	1.95	Ave. 0.51
16S	A	1.97	1.01
	B	1.99	0.00
	C	1.98	0.50
	D	2.01	1.01
	Ave.	1.99	Ave. 0.63
17S	A	1.93	0.76
	B	1.95	0.25
	C	1.95	0.25
	D	1.95	0.25
	Ave.	1.945	Ave. 0.35
Summative Average			0.50

Table II—Strength Values of Cold-Rolled Steel Bars

Sample b=0.632 cm. d=0.158 cm. e=4.71 cm.	Modulus of Elasticity		Stress at Elastic Limit	
	10^6 kg/cm²	Per Cent Deviation from Average	10^3 kg/cm²	Per Cent Deviation from Average
2S	1.82	2.72	4.04	1.94
3S	1.91	2.14	4.05	1.70
4S	1.92	2.72	4.40	6.79
5S	1.96	4.81	4.42	7.52
7S	1.90	1.60	3.90	5.34
8S	1.90	1.60	4.27	3.64
10S	1.87	0.00	3.89	5.58
12S	1.85	1.07	3.98	3.39
13S	1.76	5.90	4.27	3.64
14S	1.84	1.60	3.93	4.61
Average	1.87	2.42	4.12	4.42

Table III—Strength Values of a Commercial Pressed Fiber Board

Sample	Modulus of Elasticity		Stress at Elastic Limit		Modulus of Rupture	
	Kg/cm²	Per Cent Deviation	Kg/cm²	Per Cent Deviation	Kg/cm²	Per Cent Deviation
Cross Direction						
3MC	38,100	1.14	308	6.21	463	10.76
4MC	37,300	1.00	297	2.42	414	0.95
5MC	39,600	5.11	281	3.10	415	0.72
6MC	35,700	5.24	273	5.86	378	9.57
Average	37,675	3.12	290	4.40	418	5.50
Machine Direction						
7MM	49,500	4.34	330	0.60	488	8.20
8MM	45,000	5.29	300	10.00	392	10.86
9MM	49,500	4.34	347	4.52	430	4.65
10MM	44,400	6.71	337	1.51	474	5.10
11MM	48,800	2.87	348	4.82	472	4.65
Average	47,440	4.71	332	4.29	451	6.69
Summative Average		3.91		4.34		6.09

Figure 2—Full view of static bending apparatus.

Static Bending

Static bending tests were first tried on an apparatus that was similar to the type described by Heritage, Shafer and Carpenter *(1)*. The specimen was placed on hard steel rods ¼ inch in diameter and spaced 4.71 centimeters from center to center. Water was added at a constant rate to a bucket hung from a stirrup at midspan of the specimen. A fine chain connected the top of the stirrup to a lightweight pulley which moved a pointer along a scale so that deflections could be read. A suitable sized pulley was attached to the pointer so that the ratio of magnification of the deflections was large enough to permit reading. However, the apparatus was not sufficiently accurate or sensitive for measuring the extremely small deflections. The bending of the rods, the stretching of the chain or wire to the pointer, the weight of the pointer and friction of the pulleys, and the grossness of the scale and pointer all introduced errors altogether too large.

A new type of apparatus was designed to overcome these difficulties. The apparatus is a very rigidly constructed, solidly braced, compact unit, with the test specimen, supports, indicating gauge, and load all supported by the same framework. The specimen supports (see Figure 1) are made from a ¼-inch hard steel rod sawn lengthwise (*A*) and soldered parallel to each other, 4.71 centimeters from center to center, on a square steel frame (*B*). Midway between the specimen supports on the back piece of the square frame is a 3/16-inch threaded hole for the gauge supporting rod (*C*). The frame (*B*) is bolted to the midspan of two bars, each ⅜-inch by one inch by nine inches long (*D*). These two bars have two ½-inch holes, eight inches center to center, so that they slip snugly on two ½-inch parallel horizontal steel rods 15 inches long, which are bolted to a heavy solid table and extend out four inches from the table (Figure 2). A supporting brace ⅜-inch by one inch by 30 inches long,

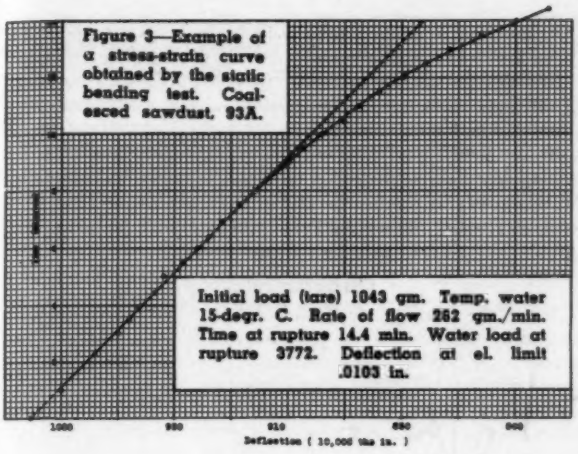
Initial load (tare) 1043 gm. Temp. water 15-degr. C. Rate of flow 262 gm./min. Time at rupture 14.4 min. Water load at rupture 3772. Deflection at el. limit .0103 in.
Deflection (10,000 ths in.)

Figure 3—Example of a stress-strain curve obtained by the static bending test. Coalesced sawdust, 93A.

extends from each rod [between the bars (*D*) supporting the frame (*B*)] to the concrete floor. A threaded rod connects the two braces two inches above the floor, and, by means of a winged nut, the braces are adjusted to the floor level and kept from slipping.

The test specimen (see Figure 1) is placed on the supports (*A*) with the stirrup being at midspan. Centered and welded on top, the stirrup is a ¼-inch diameter rod, ⅛-inch high, which acts as the seat for the rounded spindle of the gauge. The gauge is attached by set screw to the supporting rod (*C*). The gauge used is a dial type reading in ten-thousandths of an inch. In the stirrup is placed a hook which supports a bucket (Figure 2). Water is added to the bucket at a constant rate through a calibrated orifice fed from a constant level reservoir (Figure 2).

In the manipulation of the apparatus, the test specimen, after measurement with a caliper, is laid across the supporting rods and the stirrup placed at the midspan of the specimen. A bucket is hung on the stirrup by means of a hook. The weight of the bucket, hook and stirrup is taken as the initial load. After the bucket is in place, the indicator dial is adjusted and the initial reading taken. A constant rate of water flow is then started into the bucket and a stop watch started at the same time. Deflections are read at thirty-second intervals until rupture occurs, when the time of rupture is noted. A stress-strain curve is obtained by plotting the deflections against time (load). The load at elastic limit and at rupture is calculated from the time to these points, the rate of flow, the temperature of the water and the initial load. The deflection caused by the initial load is obtained by extrapolating to the abscissa axis. A typical stress-strain curve for a coalesced wood flour specimen is shown in Figure 3.

The test specimens were cut to a width of about 1.2 centimeters. The thickness of most samples tested was about 0.35 centimeters. It is essential that great care be taken in measuring such small samples or considerable error will be introduced. Five measurements were made at different points and averaged to obtain the width and the same was done for thickness. Each reading was measured by a micrometer caliper to one-thousandth of a centimeter.

From the various data obtained, the modulus of rupture (breaking strength), the modulus of elasticity (stiffness), and the stress at the elastic limit can be calculated by the usual engineering formulae:

Table IV—Strength and Hardness Values of Coalesced Sawdust Boards

Sample*	Test**	Modulus of Elasticity		Stress at Elastic Limit		Modulus of Rupture		Hardness	
		Kg/cm²	Per Cent Deviation	Kg/cm²	Per Cent Deviation	Kg/cm²	Per Cent Deviation	Penetration, Mm.	Per Cent Deviation, Average
39	A	31600		143		163		.40, .37, .37, .37	
	B	32600		145		183		.39, .39, .38, .38, .36	
	Ave.	32100	1.56	144	0.69	173	5.77	.38	2.6
40	A	28000		140		163		.31, .31, .34, .35, .38	
	B	25700		139		170		.37, .38, .32, .39	
	Ave.	26850	4.29	139.5	0.35	167	2.09	.35	7.6
42	A	29600		151		173		.37, .37, .35, .35	
	B	29200		158		209		.35, .36, .38, .35	
	Ave.	29400	0.67	155	2.25	191	9.42	.36	2.8
43	A	32900		157		194		.38, .38, .38	
	B	32200		181		231		.40, .38, .40, .39	
	Ave.	32550	1.07	169	7.10	212	9.26	.39	2.6
82	A	47600		194		252		.31, .29, .31, .32	
	B	46200		182		244		.31, .40, .37, .37	
	Ave.	46900	1.49	188	3.19	248	1.61	.34	10.2
83	A	48000		201		264		.31, .32, .30	
	B	42800		209		254		.31, .30, .31	
	Ave.	45400	5.72	205	1.95	259	1.92	.31	1.6
84	A	38800		173		226		.39, .38, .39, .36	
	B	41500		161		231		.39, .40, .40, .36	
	Ave.	40150	3.36	167	3.59	229	1.08	.38	3.7
85	A	31800		166		200		.40, .36, .32, .32, .32	
	B	33700		160		204		.35, .39	
	Ave.	32750	2.93	163	1.84	202	0.99	.35	2.7
81	A	52200		222		256		.30, .32, .31	
	B	48500		181		231		.34, .35, .33	
	Ave.	50350	3.67	201	10.45	243	4.93	.33	4.5
99	A	44700		186		228		.38, .36, .31, .40	
	B	39700		220		242		.36, .32	
	Ave.	42200	5.92	203	8.37	235	2.97	.36	7.0
100	A	38800		154		207			
	B	40100		138		196			
	Ave.	39450	1.64	146	5.48	201	2.73		
101	A	64800		235		255			
	B	66700		222		236			
	Ave.	65750	1.43	228	2.63	245	3.67		
Summative Average			2.81		3.99		3.87		4.53

*These samples were prepared under different conditions and therefore differ in strength.
**Separate strips for static bending tests, and different sides for hardness tests.

Modulus of rupture	$R = \frac{1.5\ W\ l}{b\ d^2}$	Where:	
		W = load at rupture	
		P = load at elastic limit	
Modulus of elasticity	$E = \frac{P\ l^3}{4\ a\ b\ d^3}$	b, d, l = breadth, thickness and span of specimen	
Stress at elastic limit	$S = \frac{1.5\ P\ l}{b\ d^2}$	a = deflection at elastic limit	

In order to investigate the effectiveness of the apparatus, tests were made on cold-rolled steel bars of uniform dimension. The modulus of elasticity was determined for three bars by loading and reloading each bar four times to a point between 50 and 60 per cent of the load at elastic limit. From the stress-strain curves obtained for each run, the modulus of elasticity was determined. The results are shown in Table I. The average per cent deviation for the four tests on each specimen was calculated and then these averages were averaged giving a per cent deviation of 0.50 per cent. The maximum per cent deviation for any one test was 1.01 per cent. These results show that the apparatus yields accurate and reproducible results.

Table II shows the results obtained by loading ten different cold-rolled steel bars beyond the elastic limit. Since the bars are of the same size and from the same original piece, the per cent deviation of the individual strength values from the average might be expected to be relatively small. The values obtained with this apparatus indicate relatively small variations. Table III shows the variations in strength obtained with this apparatus between different test specimens of a commercial pressed fiber board.

Table IV shows the strength values of different samples of coalesced sawdust. Two specimens were tested from each molded sample. The deviation from the average for the two tests on each sample was calculated and then these figures were averaged to give the average deviation obtained in measuring a number of specimens of coalesced wood. The deviations are comparatively small, being 2.81 per cent for the modulus of elasticity, and 3.87 per cent for the modulus of rupture, and are probably due mostly to variations in physical properties between the test strips.

The coalesced sawdust samples were prepared by pressing at various pressures 20-60 mesh Idaho white pine sawdust containing 6.5 per cent water (12 grams oven dry basis) in a four-square-inch mold for fifteen minutes at fairly high temperatures. Two test strips, each about 1.2 centimeters wide, were cut across the center of each disc.

Hardness Testing

A hardness tester was devised which is suitable for various molded or pressed wood and fiber products. It involves pressing a steel rod with a hemispherical tip 0.444 inches in diameter into the sample under a given load and measuring the depth of penetration. The rod is mounted on a one-square-inch piston which rests on oil in a cylinder. The pressure is read directly from a gauge. The load is applied by a hydraulic press. The instrument rests on the lower platen of the press and the sample is placed between the upper press platen and the hemispherical tip of the hardness tester. A small pin resting against the upper press plate operates an indicator which magnifies the actual depth of penetration about fifteen times. The depth is measured directly from a scale in millimeters.

After the sample is in place, a pressure of 50 pounds is applied and the zero reading of the pointer recorded. The pressure is then raised to 500 pounds and the depth of penetration read at once. It was found desirable to use an initial pressure of 50 pounds to equalize surface irregularities and to insure a constant degree of contact for all samples. At least five readings should be taken for each sample.

In Table IV are the results of hardness tests on a number of different coalesced sawdust samples. The average of the deviations of ten samples is 4.53 per cent. The average deviation for a number of commercial insulating, wall and hard-pressed boards varied from 1.00 to 3.91 per cent. A sketch of this instrument and its use in testing fiber boards has been previously published *(2)*.

Conclusions

The static bending apparatus designed for testing small specimens of molded or pressed wood, fiber and lignin products is easy to manipulate and gives reproducible accurate results. Using the same specimens of cold-rolled steel bars, the apparatus gave a maximum deviation from the average of 1.01 per cent and an average deviation of 0.50 per cent for modulus of elasticity. With different specimens of the same materials (cold-rolled steel, commercial pressed fiber board, and coalesced sawdust) the apparatus gave reproducible results. Due to the small size of the samples it is necessary to measure the dimensions very carefully or considerable error will be introduced.

The hardness testing instrument described gives a satisfactory measure of the relative hardness of different samples. It gives reproducible results on specimens which are uniform in physical properties.

Literature Cited

1) Heritage, C. C., Shafer, E. R., and Carpenter, L. A., *Paper Trade J.* 89, TAPPI Sec. 182-185 (Oct. 24, 1929).
2) Jahn, Edwin C., *Paper Trade J.* 101, TAPPI Sec. 148-153 (Sept. 19, 1935).

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▶▶▶ CONTRARY TO THE IMPRESSION among many scholars, culture in this world is absolutely dependent upon economic prosperity. It was no accident that the Periclean Age came at a time when ancient Greece was very prosperous and had established a thousand trading posts in all parts of the civilized world. When her commercial prosperity died out, the culture of Greece was at an end too.

The great Augustan period of Roman literature flowered when the Roman Empire enjoyed its peak of commercial prosperity and collapsed when the economic system collapsed. The same was true with the Italian Renaissance, that golden period of art and culture. When material riches of business failed to sustain it, the creative period of culture was at an end. After all, artists must eat and must have leisure time to do their work.

At every age in history it was the material wealth of industry that stimulated and supported cultural pursuits. As a result, culture today is most widespread in those lands where industry is most productive. America has been fortunate in this respect, due to our highly efficient business system with its mass production and modern advertising.—*Bureau of Research and Education, Advertising Federation of America.*

▶▶▶ WHATEVER ELSE MAY HAVE HELPED, the American spirit of business enterprise has been the mainspring of our progress, aided at every point by the use of good advertising in distributing the products of industry. The high standard of life in America is an achievement of business, and it is not the nature of business to be satisfied with past performances. The imagination is challenged by goals of the future.—*Bureau of Research and Education, Advertising Federation of America.*

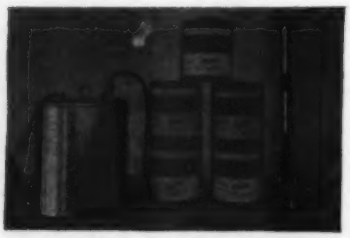
PAPER SKETCHES

CUSHIONS STUFFED WITH PAPER WERE FURNISHED TO WOUNDED SOLDIERS DURING THE FRANCO-PRUSSIAN WAR (1871)
THE AVERAGE THICKNESS OF THE PAPYRUS MOST COMMONLY USED IN ANCIENT ROME IS SAID TO HAVE BEEN ABOUT FIVE TIMES THAT OF ORDINARY LETTER PAPER.
MR. STENMEN OF PIGEON COVE, MASSACHUSETTS, RECENTLY MADE A PIANO CABINET AND BENCH FROM ROLLED NEWS PAPERS.
FROM STANDING TREE TO FINISHED PAPER IN ONE HOUR AND FIFTY NINE MINUTES WAS THE RECORD ESTABLISHED IN 1896 BY A PULP AND PAPER MANUFACTURER OF EBENTHAL, GERMANY

NEW EQUIPMENT AND SUPPLIES

Foam-Making Water Nozzle

Pyrene Manufacturing Company, Newark, N. J., has announced a foam-making water nozzle which makes from 500 to 750 gallons of fire-smothering foam per minute and produces 350 gallons of foam from only one gallon of Phomaide solu-



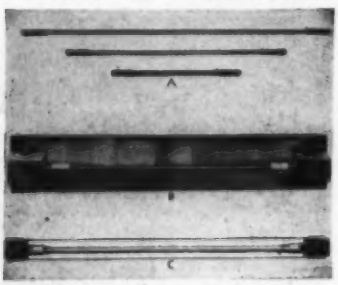
tion. The nozzle, designated as Phomaire Play Pipe Model PP24, is connected to a hose line and to a Phomaide knapsack which is carried on operator's back. When the water is turned on, Phomaide and air are drawn into the water stream to form foam. Only 35 to 40 gallons of water per minute, at a pressure of 75 pounds or more, is required for operation.

Controller for Electric Trucks

A cam-operated contactor controller, designated as Cam-O-Tactor, has been developed by The Yale & Towne Manufacturing Co., Philadelphia, Pa., for use as standard equipment on Yale electric trucks. This controller, according to the manufacturer, makes and breaks contacts without the usual sticking or welding of electrical surfaces; and combines the high current interrupting capacities and long life of contactors with the positive action and safety of mechanical cam-operation.

Sterilizing Lamp

Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has announced the development of a lamp which through selected ultra violet radiations, kills bac-



teria and prevents mold. The lamp, designated as the Sterilamp, is a slender rod-shaped glass tube with an effective length of either 10, 20 or 30 in. It operates on the gaseous discharge principle in an atmosphere of inert gases and mercury vapor. Over 80 per cent of the radiant energy produced by the lamp is in the region of 2550 angstroms, which, according to the manufacturer, provides the most effective bactericidal energy for the power consumed. A specially designed power unit for operating the lamp consists of a transformer, relay, starting button, and safety door switch—all enclosed in a metal housing. Each power unit is capable of operating one to four 30 in. lamps, one to five 20 in. lamps, or one to six 10 in. lamps, from any 60 cycle supply voltage between 110 and 120 volts. Two types of fixtures, complete with sockets, terminal boxes, and necessary hardware, have been designed to permit ceiling, wall, or open mounting of the lamp.

Portable Vertical Welder

A 150 ampere vertical type portable welder for a wide range of work in welding lighter gauge, ferrous and non-ferrous metals has been announced by the Harnischfeger Corporation, 440 W. National Avenue, Milwaukee, Wisconsin, as an addition

to its line of P & H-Hansen electric arc welders. This machine is less than 4 ft. in overall height. It is furnished in A. C. drive only. There is a fresh air intake at top and an exhaust at bottom for ventilating and cooling. A towing handle and two wheels provide easy movement of unit. The unit also can be furnished with lifting ring and without wheels where portability is not necessary.

Wax With Adhesive Properties

Glyco Products Co., Inc., 148 Lafayette Street, New York, N. Y., has introduced a wax which exhibits high adhesive properties even on glass and metals. The wax, known as Flexo Wax C, is amorphous or non-crystalline. It blends easily with resins, oils, and other waxes; and is being used for coatings and in laminating work of various kinds.

Scale Truck

An integrally combined beam scale and lift truck as well as a lift truck equipped to accommodate a standard dial scale has been announced by Barrett-Cravens Company, 3255 West Thirtieth Street, Chicago, Illinois. The integrally combined beam

scale and truck is supplied with a capacity of either 3500 or 5000 lb.; with either a single or multiple stroke mechanism for the truck; in widths of 19 in. and 25 in.; in lengths of 36 in., 42 in., 48 in. and 54 in.; in heights lowered of 7 in., 9 in., and 11 in.; and in lifting heights from 1⅝ to 6 in. The lift truck for accommodating the standard dial scale, a scale with a platform 21 in. wide by 29 in. long, is of the single stroke type; has a capacity of 2500 lb.; and is 26 in. wide and 66 in. long. .

Portable Current Transformer

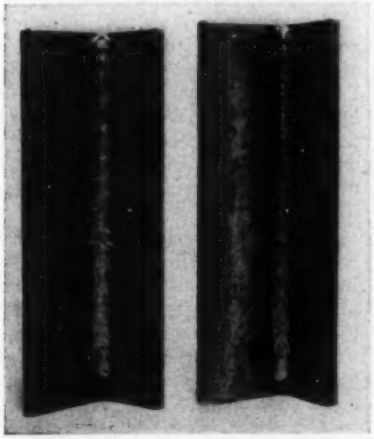
A portable current transformer, designated as type PC-137, has been announced by Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., for general portable service where maximum in accuracy and breadth of operating range are required. The transformer is of the combination "through" and tapped construction. It

is housed in moldarta with maroon and nickel finish. Windings are insulated and fixed in relation one to the other and to iron core. "Through" capacities of 1000, 500 and 250 amperes are obtained by passing conductor through provided opening. Capacities of 100, 50, 25 and 10 amperes are provided with terminals mounted on the top of the case. Secondary terminals

are marked and provided with a short circuiting switch for safety and convenience. Currents from 20 to 2,000 amperes may be measured with a single hook up if the transformer is used with a Westinghouse type PY-5 triple range ammeter of 2-5-10 amperes capacity.

Compound Facilitates Cleaning After Welding

A compound, known as Spatter Film and which is said to reduce cleaning time after welding by 20 to 60 per cent, has been announced by The Lincoln Electric Company, Cleveland, Ohio. This compound reduces the tendency of spatter to adhere



tightly. It is soluble in water; is non-inflammable; contains no free alkali to injure hands or harm paint; and is easy to apply by means of an ordinary paint brush. A gallon of the compound will cover approximately 50,000 sq. in. of surface. It can be removed readily for painting by wiping with a clean cloth, if still wet, or by washing it off with water, if dry. The compound is sold in quart, gallon and 5-gallon cans, or in 55-gallon drums.

Medium Spread Floodlight

The Benjamin Electric Mfg. Company, Des Plaines, Illinois, has announced a weather-proof, aluminum floodlight for out-

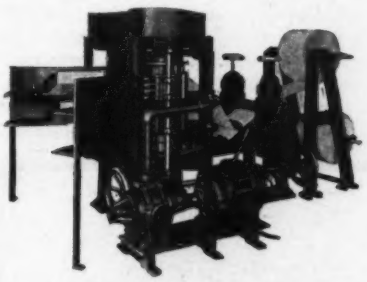
door locations that is designed for use with a 750, 1,000 or 1,500 watt lamp, or with a 1,000 watt Bi-Post lamp when supplied with necessary lamp holders. The unit, designated as the new "Alzo-Lite" floodlight, has a symmetrical beam with a spread of approximately 65 degrees. Its reflecting surface is protected against deterioration through treatment by the patented Alzak process. Likewise, a heat resisting glass cover is available, if required. There also are various styles of mounting brackets which permit the floodlight to be mounted on cross arm, clamped to pipe, or, with slip-fitter, fitted on to a 1½ to 2 in. iron pipe mast.

Metal Protective Paints

A line of metal protective paints in which a synthetic product known as Kem Liquid is used in their formulation has been announced by The Sherwin-Williams Company, Cleveland, Ohio. These paints designated as the S-W Kem-Metal protective paints, include Kem-Kromik metal primer, Kem-Elastic metal protective paints, and Kem red lead (primer). They are stated by the manufacturer to have the following advantages: more complete exclusion of water and gases from the metal protected, a definitely greater durability, and an improved appearance that is maintained in service.

Rotary Vertical Napkin Folder

A rotary vertical napkin folder, known as the "New Vertivac," has been announced by the Paper Converting Machine Company, Green Bay, Wisconsin. This folder utilizes a vacuum system for carrying and folding; has full anti-friction bearings; is supplied with or without embossing units



and printing presses; and has a capacity of 1500 napkins of any established size per minute on two webs. Eight napkins are produced in each revolution of the folding rolls. The folder also can be equipped to fold special size—⅞, ⅛ or ¼ fold-napkins in one combination.

Heat Exchanger

Condenser Service & Engineering Co., 310 Twelfth St., Hoboken, N. J., has announced a heat exchanger under the designation of Ribbon Counterflow Exchanger and Cooler. This unit has narrow, flat passageways arranged for counterflow heat transfer. There are no gasketed joints which could permit leakage between fluids. All passageway or transfer surfaces are accessible for cleaning; are streamlined to reduce turbulence and friction losses; and are relatively thin to obtain a high heat transfer rate. In performance tests with clean surfaces, according to the manufacturer, heat transfer rates of over 500 Btu. per sq. ft. per degree Fahr. have been obtained.

New Eyeshield Design

The Jackson Electrode Holder Co., Detroit, Mich., has announced a new design of eyeshield which consists of a comfortable light headgear to which is attached an assembly consisting of a lens frame and two side protection members. The entire assembly can be pushed up, out of the way when not in use. The lens frame swivels to permit adjustment of the lens angle and provision

also is made for adjustment of the distance of the lens from the face. The lens frame and side pieces may be made of light, opaque material or of transparent, non-inflammable material. The lens frame also may be cut away sufficiently on the under side to allow vision under the lens, as well as through the lens, without adjusting the lens frame. Lenses conform to Standard Federal Specification and are protected by cover glass.

Small Rotary Air Tools

A line of rotary air drills, grinders, screw drivers and nut setters, designated as the No. 9 Series, has been announced by The Cleveland Pneumatic Tool Co., 3734 East 78th Street, Cleveland, Ohio. The drill has a capacity of ⅛ in. to 3/16 in. holes in steel. The grinder will handle mounted emery wheels to ¾ in. in diameter. The nut setter is recommended by the manufacturer for nuts to ¼ in. bolt size. The screw driver handles machine screws to size 12.

Safety Saw

A safety saw, designated as the W-60 Safety Saw, has been announced by the Stanley Electric Tool Division, The Stanley Works, New Britain, Conn. This saw, fully equipped with Stanley safety features,

has a 6 in. blade, which cuts to a depth of 1⅞ in., and a handle, which has two gripping positions. The saw is packed in metal carrying case with combination rip and cross-cut blade, ripping gauge, wrench, lubricant and rubber covered three-wire cable.

ALLIED

FIVE THOUSAND YEARS HENCE ... GOAL OF "TIME CAPSULE"

FIVE thousand years in the future! Fifty centuries from now! This tremendous scope of time is almost too great for present-day man to comprehend, almost too amazing to be real. To think, therefore, of bridging this span—to think, as it were, in the terms of the year 6939 A. D. seems incredible and fantastic. Nevertheless, a "message" to this world of the future—a "message" which, it is hoped, will be able to reach mankind five thousand years from now—has already been "sent."

On September 23, 1938, there was deposited in the depths of the earth, what might conceivably be the most important record of a civilization ever left to a future civilization; a record which, if all the knowledge, skill, ingenuity and resources at the command of modern science can prove effective against the ravages of time, will be seen by the eyes of man five thousand years hence—in the year 6939 A. D.

This "Time Capsule" containing a well-chosen "cross-section of our times" was deposited on the grounds of the New York World's Fair by the Westinghouse Electric and Manufacturing Company. It was designed by a committee of engineers headed by M. W. Smith, manager of engineering at the Westinghouse company, and is made of Cupaloy, a recently-developed copper alloy. Cupaloy consists principally of copper, alloyed with a small percentage of chromium and silver. This metal may be tempered to a hardness equal to that of steel, yet has a resistance to corrosion equal to that of pure copper.

The casting and precision machining of the seven-foot capsule was done by expert craftsmen at the Westinghouse company's East Pittsburgh works. The capsule was cast in seven sections and after machining, all segments except the last were screwed together and sealed with an asphalt compound. The joints were peened out and burnished, forming a solid, unbroken outside shell of Cupaloy, shaped like a torpedo, seven feet, six inches long and eight inches in diameter. The inner crypt of the capsule contains a six-foot envelope of heat-resistant Pyrex glass, embedded in mastic waterproofing and shockproofing, into which the objects representing "a cross-section of our times" were placed. The envelope was filled with inert gas to act as a preservative. Before the capsule was lowered into the ground, the last Cupaloy section was assembled, shrunk-fit on tapering threads, to produce a water-tight joint.

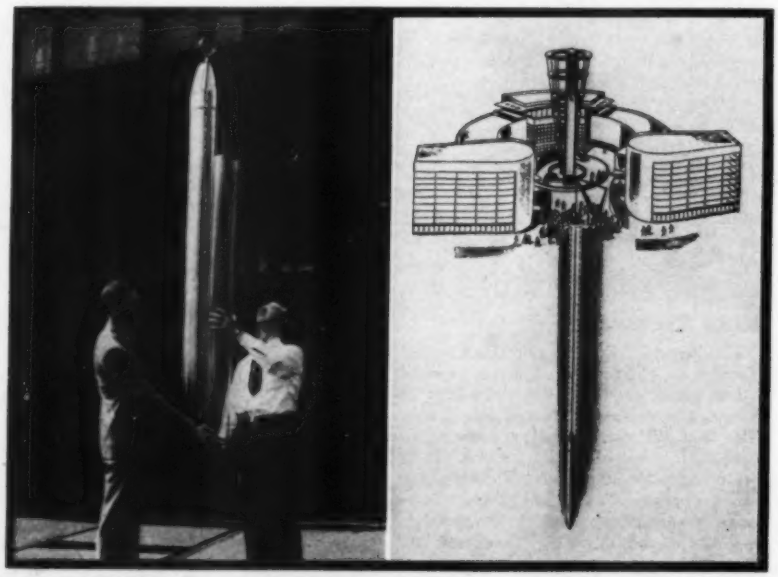
One of the most important objects placed within this "message to the future" was the eleven hundred feet of Micro-File film prepared by the Recordak Corporation. Into this film are compressed more than ten million words and a thousand illustrations, including books on industry, invention and science, two dictionaries, a score of magazines, great chunks from the Encyclopedia Britannica and even Walt Disney's "Donald Duck." So that the people of fifty centuries hence may understand what they read, there is included a section of aids to translation.

Three noted men of science and literature, Dr. Albert Einstein, Dr. Robert A. Millikan and Dr. Thomas Mann, wrote special texts which were included in the "Time Capsule." These messages, together with a letter from Grover A. Whalen, president of the New York World's Fair, were printed in permanent ink on the finest type of paper.

Many objects in common, daily use were also deposited within the capsule, some of which include: a woman's hat, a make-up kit, a nail file, a toothbrush, poker chips, tobacco, a camera, an electric lamp and a safety pin. Even the well-known can-opener was not forgotten. Samples of twelve staple-crop seeds were also included.

Only two books were deposited within the crypt. These were, a selected, leather-bound, rag-paper copy of the Holy Bible and a copy of the Book of Record of the Time Capsule. Copies of the latter volume will be distributed to libraries, museums, etc., in the hope that some will be found 5,000 years hence. This record book was printed on 100-pound Permanent Ivory Wove paper manufactured by the Hurlbut Paper Company. The ink, black and red, was especially compounded by the International Printing Ink Corporation. The book itself was designed by Frederic W. Goudy and was printed by Howard Coggeshall. G. Leonard Gold of the Prestige Book Company produced the volume and the binding was planned and produced by Randall W. Bergmann of the Russell-Rutter Company.

The Book of Record contains a message to posterity, asking that it be preserved and translated into new languages as they arise, a description



Left—J. B. Seastone (left) and W. A. Graham, Westinghouse engineers, inspect the "Time Capsule" and its inner shell of heat-resistant glass, just before they were packed for shipment to New York. Right—Deposited fifty feet below ground at the New York World's Fair, the "Time Capsule" rests exactly beneath the Westinghouse building's great hall of Electrical Power and Electrical Living. There, it is expected to remain intact for 5,000 years.

of the "Time Capsule," and detailed instructions for finding, raising and opening the capsule when the time has come. The instructions include astronomical data furnished by the U. S. Naval Laboratory; the exact latitude and longitude determined closely enough by the U. S. Coast and Geodetic Survey to locate a spot the size of a quarter-dollar on the earth's surface; instructions for locating the capsule by electro-magnetic prospecting, and a "Key to English" prepared by Dr. John P. Harrington of the Smithsonian Institute.

During the World's Fair the capsule may be on view through a periscope and inside the Westinghouse Building will be a replica, together with duplicates of all the items it contains. When the Fair is over, pitch and concrete will be poured down the well; the retaining pipe will be removed, and the capsule will be left for discovery by archaeologists of the future.

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ARC WELDING PAPERS WIN MANY AWARDS

Awards in the James F. Lincoln Arc Welding Foundation's Award Program were made September 15 to winning entrants in the $200,000 contest which began eighteen months ago. Recipients of the awards submitted papers on subjects representative of practically every product and structure of industry.

Altogether, 382 awards were made by the Foundation. The amounts ranged from $101.75 for honorable mention to $13,941, the Grand Award, which went to Mr. and Mrs. A. E. Gibson, president and stockholder, respectively, of the Wellman Engineering Company, Cleveland, Ohio.

Recipients of awards in the pulp and paper division included: C. W. Willits, chief engineer, Mitts and Merrill, Saginaw, Mich.; Joe Baxter, Jr., sales engineer, Shartle Bros. Machine Company, Middletown, Ohio; Walter J. Hartwig, designer, D. J. Murray Mfg. Company, Wausau, Wis.; E. J. Chapman, Bagley & Sewall Company, Watertown, N. Y.; A. J. Aubin and H. W. French, engineers, Hammermill Paper Company, Erie, Pa. Mr. Willits received $712.28 and Messrs. Baxter, Hartwig and Chapman each received $101.75. Messrs. Aubin and French received $101.75 jointly as co-authors.

A variety of subjects were presented by the winners in the pulp and paper section. "Redesign of Paper Excelsior Shredder," showing how redesign for welding permitted weight savings and cost reduction was Mr. Willit's contribution. Mr. Baxter's paper, "Verti-Screen," illustrated a weight saving of 6,500 to 8,000 pounds by application of arc welding to vertical screen plates for fiber separation and accompanying parts of a paper machine while Mr. Hartwig's paper, "Hammer Crusher for Pulp and Paper Mill," showed that use of welded crusher parts permitted a saving of $166.89 per machine, reduction in weight and longer life. "Dryer Section of a Paper Machine for Heavy Corrugated Paper," Mr. Chapman's paper, showed a saving per machine of $20,985, while Messrs. Aubin and French demonstrated a saving of $5,412 per machine in their paper, "Redesign of a Paper Machine Dryer Frame."

The Foundation's Award Program was judged by 31 engineering authorities throughout the country and has been hailed by leaders in science, education and industry as a valuable contribution to industrial progress in America.

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▶▶▶ THE SAMUEL M. LANGSTON COMPANY, through its senior erector, E. H. Rowand, recently aided in the installation of a used combination corrugating machine of Langston manufacture in the plant of the Diaz Company, Havana, Cuba. The Cuban firm will manufacture corrugated shipping containers.

NEW DILTS UNITS AT AMERICAN BOX BOARD COMPANY

The Dilts Machine Works of Fulton, New York, is installing several new units in the American Box Board Company at Grand Rapids, Michigan. The latter firm is currently engaged in a $250,000 expansion and modernization program which calls for a revamping of one mill for the manufacture of light colored box board for the carton trade.

For stock preparation Dilts is installing a complete system, consisting of a 100-ton breaker beater with braced bar roll, settling trough, Classifiner, rag catcher, two thickeners and pumps to service the entire installation. The company is also making major improvements on the two cylinder board machines and fourdrinier straw machines. These changes include new fan pumps, new stock and circulating pumps and, in addition, ahead of each of its 13 vats the company will install one of the new Dilts-built Vertical Cowles Classifiners for final screening. A new boiler costing $110,000 has also been installed.

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▶▶▶ Export Manager *J. F. Mitchell-Roberts,* of Oliver United Filters, Inc., arrived in India the latter part of September for an extended stay. He is visiting all the cane sugar producing centers where there is much interest in the Oliver-Campbell Cachaza Filter.

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IPI ANNOUNCES ANNUAL STUDENT ESSAY CONTEST

Trips to both World's Fairs, New York and San Francisco, will be offered to contestants in the Third Annual IPI Essay Contest for high school printing students, which is announced this month. IPI will sponsor this project once more in co-operation with the National Graphic Arts Education Guild.

Authors of winning papers in the Pulp and Paper Section of the Lincoln Foundation Award Program included, left to right: A. J. Aubin, Hammermill Paper Company; H. W. French of the same firm; E. Chapman of the Bagley & Sewall Company; W. J. Hartwig of the D. J. Murray Mfg. Company; C. W. Willits of Mitts and Merrill, and Joe Baxter, Jr., of Shartle Brothers Machine Company.

TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Limitations of Laboratory Beating Studies

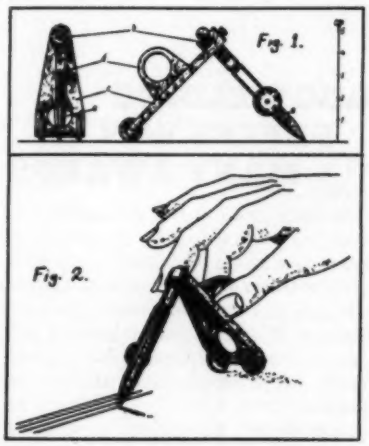
The author emphasizes the precautions required in attempting to correlate laboratory beating data with results obtained in large scale mill practice and finds that often certain factors, especially beating pressures, which can be controlled in laboratory beaters are subject to very wide variations in the mill. Hence judgments of the value of laboratory studies, in their final analysis depend on mill conditions. For example, experimental data obtained with certain types of stocks beaten in the Lampén mill did not check in their properties with those obtained in the plant. This led to the construction of the Aylesford laboratory beater. After careful description of this apparatus and of a series of comprehensive experiments, the following conclusions were reached: bursting strength decreases with increased beating pressure (Mahldruck), and the time of beating required to arrive at a definite degree of beating is decreased. Breaking length remains constant over a wide range of beating pressures, even after there has been a marked decrease in bursting strength. However, the fluctuations in the operation of a beater have a definite influence on the breaking length.

The construction of a specific beater, and its resultant operation (with its possible deformation or damaging of fibers) is of marked importance. With certain pulps, the higher the speed of the beater roll, the greater the tendency towards increased bursting strength of the sheet. This, however, was not found to be the case with easy-bleaching sulphite pulp. There seems to be no correlation between speed of beater roll and breaking length. Power consumption per ton falls with increasing pressure. The beating time varies inversely with r.p.m. of the beater roll. In general, beating time determines the quality of the stock.

The author compares experimental data in the Lampén and Aylesford laboratory mills with those obtained with mill beaters. The laboratory results which checked each other gave lower breaking lengths than did large scale equipment. However, as far as power consumption goes, the Lampén mill gives the possibility of estimating power consumption in mill practice. The Aylesford instrument should be considered as a tool simply for obtaining precision data. The original article contains 21 illustrations. L. G. Cottrall, Svensk Pappers-Tidn, 41, 175-193 (1938) through Papier-Fabr. 36 (Abstracts) 119 (1938).

Standardized Penstrokes in Paper Testing

The penstroke method, which furnishes a visual means of gaging the diffusibility through a sheet of writing paper, has been standardized. The theoretical basis for this method has been discussed at some length. Various commercial inks were examined and as a result the following formula was devised and regularly used in the standard procedure: 10 grams of medicinal Trypanblue (i. e., the tetrasodium salt of tolidintetrazo—H—acid), 10 grams of glycerine 31 deg. Be, and 1 gram of carbolic acid per liter of water. The technique of the preparation of this ink is carefully described. It



is permanent, and shows no change or sedimentation even after keeping for years. The standardized drawing pen is shown in Figures 1 and 2. Rollers are provided, and the pen, with carefully regulated screw which provides for a suitable width of ink line is charged with ink to a height of 5 mm. The penstroke should be about 0.6 mm. wide. The exact method for carrying out the test is described in detail. In a writing paper, well sized and of good quality, the inked lines should remain sharp, and no ink should show through the under side of the sheet within 24 hours. The test insures clean-cut reproducibility. August Noll. Papier-Fabr. 36 (Tech-Wiss Tl.) 349-52 (1938).

Technical Studies on Blanc Fixe

This gives a means of measuring the turbidity of aqueous suspensions of barium sulphate, and of studying the conditions for attaining conditions leading to definite degrees of fineness or coarseness of the particles. The instrument for measuring turbidity is a careful modification of B. Lange's device (Cf. *Chem. Fabr.* 8, 31 1935)

How To Operate Paper Mills More Profitably
Save time and Money in these 13 Slime Areas
Piping
Filters
Beaters
Pumps
Suction Rolls
Cylinder Machines
Fourdrinier Machines
Revolving Screens
Stock Chests
Head Boxes
Centrifiners
Save-alls
Suction Bars
with MAGNUS SLIME REMOVER
MAGNUS SLIME REMOVER kills active bacteria and retards new growths . . . quickly and surely. It disintegrates and loosens growths for easy riddance by simple flushing. Its highly penetrative powers eliminate costly, time-wasting scraping and taking apart of machinery, piping, etc. It won't injure metal parts, and you can depend upon a high quality, easy sellable product. Just add MAGNUS SLIME REMOVER to the beater . . . and pump through the system.
Let a MAGNUS Paper Expert demonstrate how MAGNUS SLIME REMOVER will help you save money in your own mill, under your own operating conditions, at no cost to you.
MAGNUS CHEMICAL COMPANY
Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants
192 South Avenue
Garwood, N. J.
MAGNUS CLEANERS

which takes cognizance of certain flaws in operation as applied to turbid suspensions. This instrument is shown in Figure 1 in half-tone, and schematically in Figure 2, where the light source is (a), the convex lenses (l. and m.), the measuring instrument a sensitive coil galvanometer (g, h, and f). After (a) has been functioning for about 10 minutes, the galvanometer is set

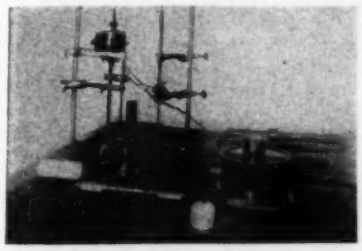


Figure 1

at the zero point by means of the shutter (i). The electric cell (d) is then darkened by use of the sliding screen (k). This condition corresponds to 100 per cent turbidity. When the suspension to be examined is placed in cell (b), the turbidity may be read directly in percentage by the galvanometer deflection. The special construction

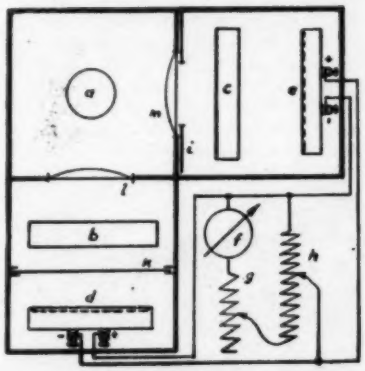


Figure 2

of (b) as well as an orientating instrument to measure reflection have been fully described and are schematically illustrated.

While barium sulphate precipitates could be obtained in varying degrees of fineness (in well reproducible experiments) by the use of 10 per cent gelatine solutions and then pouring such suspensions on standard

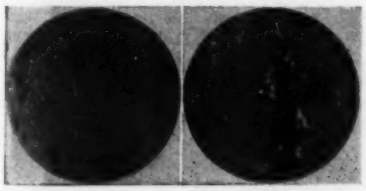


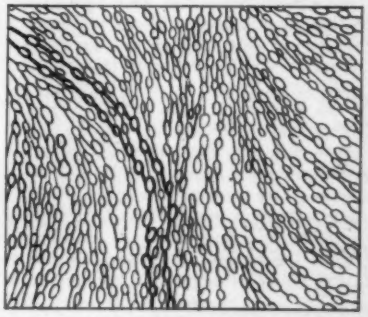
Figure 3 Figure 4

glass plates under controlled conditions, such a technique was not used. It was found best for mill control work to measure the turbidity in aqueous suspension. The effect of changing concentrations of sulphate ion, and of barium ion in the solutions prior to precipitation were all factors that were carefully studied. The most finely divided blanc fixe was evidently obtained with 0.25-0.30 normal sulphuric acid solutions or with sulphates in concentrations of about 0.15N, where the temperatures were kept low and the rate of precipitation was rapid.

When salt concentrations similar to those of sulphuric acid were used, the same degree of fineness could only be reached by precipitating at higher temperatures. Below 0.15N acid (or under 0.1N sulphates), coarse products were obtained when higher temperatures and slow rates of precipitation were employed. The widely spread belief that coarse barium sulphate is obtained only when sulphuric acid is the precipitating agent was not confirmed. Particle size is a function of the conditions used in precipitation. While most soluble sulphates (i. e. salts) behave similarly, although not identically, alum behaves much as does sulphuric acid. The authors discuss the correlation between covering power of the pigment and its turbidity in suspension. Practical experiments were also made with specially prepared $BaSO_4$ pastes. Figure 3 shows in a photomicrograph the relative particle size of $BaSO_4$, using 0.25N H_2SO_4, as compared with Figure 4, in which 0.05N H_2SO_4 was used. (At higher dilutions, particle size again decreases.) Thirty literature references, numerous graphs, and other photomicrographs are given. F. Muller and H. Aurich. Papier-Fabr. 36 (Tech-Wiss Tl) 357-62: 365-70 (1938).

Fine Structure of Fibers

The authors review 26 recent articles and then advance the hypothesis that cellulose has a net-like structure like that shown in the illustration. The theory is that chains occur which are in part crystalline, in part amorphous, and that the latter portions of



these chains serve as joints between the crystalline parts, in either individual or neighboring chains. The hypothesis seems to account satisfactorily for changes in mechanical properties during spinning and stretching of fibers. O. Kratky and H. Mark. Papier-Fabr. 36 (Tech-Wiss Tl) 345-8 (1938).

Tropical Woods and Resulting Pulps

Besides the conifer *Araucaria* (average density 0.48) which, when subjected to soda pulping, gave fibers with an average width of 0.029 mm., and length of 2.2 mm., the authors found that the woods examined could be placed roughly into three groups. The coniferous pulp when unbeaten gave poor sheets but the strength of the sheet

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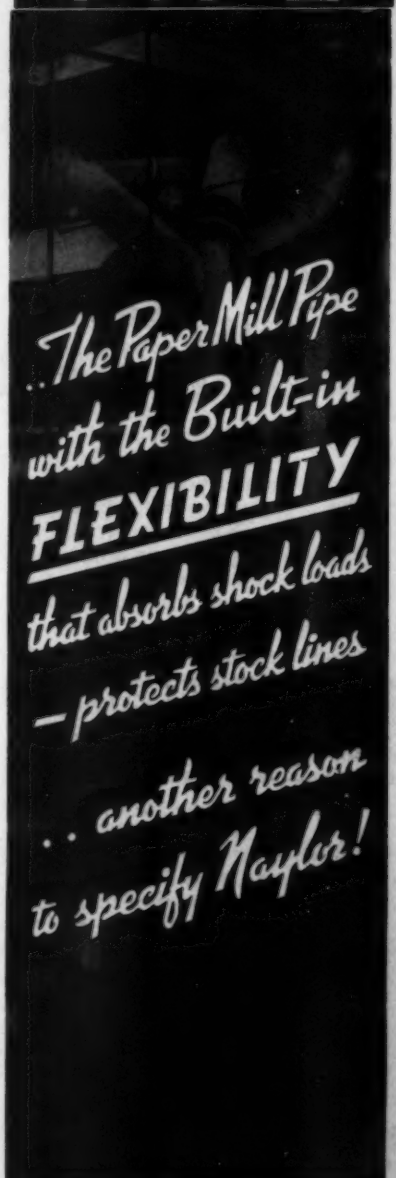

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improved very markedly after beating. The three classes of pulp, grouped according to their behavior on pulping, have been termed (1) the umbrella wood group which includes *Musanga Smithii* (soda and sulphite pulp), *Albizzia falcata* and *Ricinodendron Heudelotii* (Castor oil tree); (2) the Eucalyptus group (Comparable to European aspen)

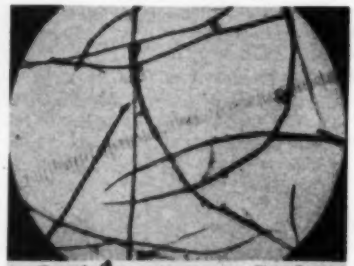


Fig. 1

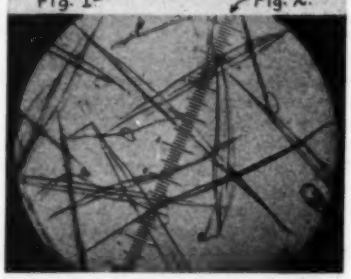


Fig. 2.

which includes *Canarium Schweinfurthii, Terminalia superba, Lannea Welwitschii,* and *Mimosa bracaatinga,* and (3) the mangrove group (*Rhizophora Mangle*) which is comparable to red beech in its behavior on pulping, and which includes *Pycnanthus Kombo,* and *Chlorophora excelsa.*

In general soda cooks were used in preparing these pulps, although in some instances, sulphite cooking was resorted to. Measurements were always made on the undamaged fibers. In group 1, the fiber width averaged (for the different species) 0.035 mm. to 0.076 mm. and the length 1.01 to 1.5 mm. The unbeaten fibers formed a firm, dense, thin sheet, which on air-drying was very resistant to tear. However, as soon as beating was attempted, these wide, band-like or tubular elements disintegrated rapidly and formed poor sheets. There is no European wood comparable to group 1. In group 2, sheet formation of unbeaten stock was less satisfactory, although when slight pressure was applied during sheet formation, a fairly satisfactory result was obtained. Here beating caused a slight improvement in the mechanical properties of the sheet. The mean fiber length range in group 2 was 0.87 to 1.25 mm., and the mean fiber width range was between 0.11 and 0.022 mm. In group 3 these average fiber dimensions were respectively in the ranges of 0.81-1.74 mm. and 0.01 and 0.024 mm. Here the unbeaten stock forms a sheet that cannot be readily removed. It is porous, fibrous and very weak. However, after beating the pulp forms very good sheets. Numerous photomicrographs are given, of which two are included herewith. Figure 1 shows a mangrove pulp (X 56 diameters) and Figure 2 an umbrella tree sulphite pulp (same magnification). Details are given with regard to variations in NaOH:wood ratio (especially for mangrove digestions). Full descriptions are also given with regard to beating, shrinkage of fibers on drying, and the technique of sheet formation. Willibald Mühlsteph. Papier-Fabr. 36 (Tech-Wiss Tl.) 341-5; 352-6 (1938).

Sack Paper Manufacture

A comprehensive historical review dealing with kraft paper manufacture, and with a description of Europe's largest sack-paper machine. The latter has a wire width of 575 cm. and can produce 90 tons of sack paper in 24 hours. Its operating speed is 184 meters per minute, but a maximum speed of 300 meters per minute may be obtained. Stock passes through 3 superstrainers and then passes onto the wire through a high pressure slice, fitted with a micrometer adjustment of the lip. In Figure 1 is shown the wet-end, built for a wire length of 28 meters, and provided with a sectional shake, large suction boxes, and a suction couch roll, with a top pressure roll. Wires may be exchanged, since the wet end is extractable. Two eccentric shakes furnish the shaking motion. Figure 2 shows the mechanical automatic guide which controls the wire. It is installed in the return run of the wire, a departure from the usual practice of placing the wire guide in front of the couch. Only one guide pan (shown in the upper left hand side of Figure 2) pressed slightly against the front edge of the wire by the use of a spring, closely follows the sideways motion of the wire. The suction roll has a diameter of 80 cm.,

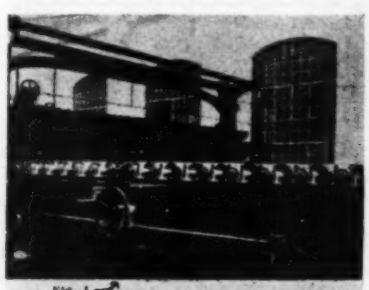
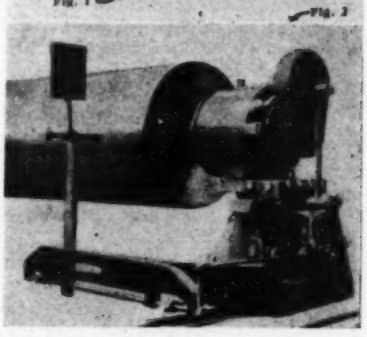
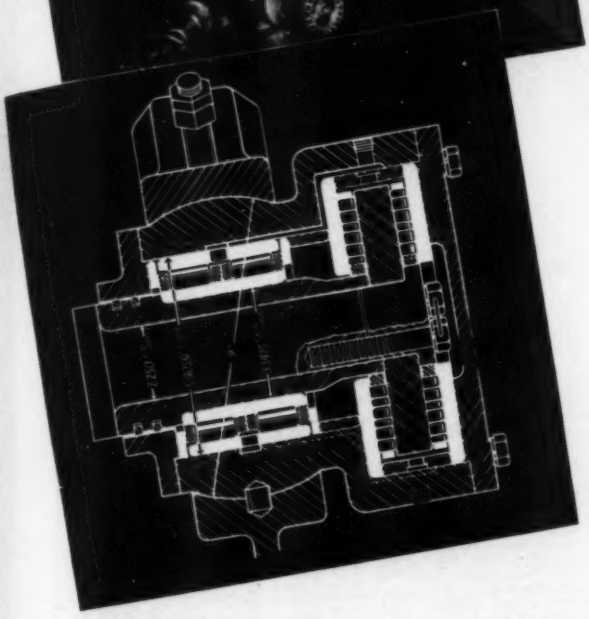


Fig. 1

Fig. 2



and the top roll is 40 cm. in diameter. The technique of effecting change of wire is described. The article also gives standard values for the stretch and strength of sack paper. G. Antonoff. Zellstoff u Papier (March, 1938), through Paper-Maker and British Paper Trade J. 96 (T. S.) 100-1 (1938).



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Old-fashioned journal bearings put a killing strain on delicate, expensive Fourdrinier wire. That's why so many mills are turning to modern Rollway Roller Bearings to save the wire and to get long, trouble-free performance in this tough spot.

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Because they're specially engineered for the work they do, Rollway breast roll bearings may be mounted on your present shake frames without change, as shown here in an installation on #2 machine of the S. D. Warren Co., Cumberland Mills, Maine. A quick detachable cap allows instantaneous removal of the roll for changing wire. Diameter of the bearing housing is less than that of the breast roll, causing no interference with installation or removal of wire. Housings are self-aligning and are completely inclosed, removing all possibility of water or dirt reaching the bearings. Ample provision is made for lubrication and drainage.

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- ★ Couch Rolls
- ★ Primary Presses
- ★ Main Press Rolls
- ★ Pulp Grinders
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AUGUST SCORES

PERFECT SCORE
Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet Mills	Waterville, Me.
	Spruce Falls Power & Paper Co., Ltd.	Kapuskasing	Ontario, Canada
	Oswego Falls Corporation	Fulton	New York
	Anglo-Canadian Pulp & Paper Mills, Ltd.	Quebec City, P. Q.	Canada
	Consolidated Paper Corp., Ltd.	Port Alfred, P. Q.	Canada
	International Paper Company	Palmer	New York
GROUP B	Paterson Parchment Paper Company	Bristol	Pennsylvania
	Nekoosa-Edwards Paper Company	Port Edwards	Wisconsin
	A. P. W. Paper Co., Inc.	Albany	New York
	Consolidated Paper Corp., Ltd.	Belgo, Shawinigan Falls	Canada
	Fraser Paper, Ltd.	Madawaska	Maine
	Detroit Sulphite Pulp & Paper Co.	Detroit	Michigan
	Crown Zellerbach Corp.	National Paper Products Co. Division	Port Townsend, Wash.
	The Mead Corp.	John H. Heald Div.	Lynchburg, Va.
	Southern Kraft Corp.	Continental Division	Marinette, Wis.
	Rayonier Incorporated	Grays Harbor Div.	Hoquiam, Wash.
	Berst-Foster-Dixfield Co.	Plattsburg	New York
GROUP C	St. Croix Paper Company	Woodland	Maine
	Hoberg Paper Mills, Inc.	Fibre Division	Green Bay, Wis.
	Cornell Wood Products Co.	Cornell	Wisconsin
	Central Fibre Products Co.	Quincy	Illinois
	Strathmore Paper Company	West Springfield	Massachusetts
	The Crystal Tissue Co.	Middletown	Ohio
	The Lawrence Paper Co.	Lawrence	Kansas
	Rayonier Incorporated	Port Angeles	Washington
	Strathmore Paper Co.	Woronoco	Massachusetts
	Port Huron Sulphite & Paper Co. Pulp Mill	Port Huron	Michigan
GROUP D	The Mead Corporation	Sylva Paperboard Co.	Sylva, N. C.
	American Writing Paper Corp.	Riverside No. 2	Holyoke, Mass.
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	The Mead Corporation	The Harriman Co.	Harriman, Tenn.
	The Mead Corporation	Southern Extract Co.	Knoxville, Tenn.
	The Upson Company	Lockport	New York
	American Writing Paper Corp.	Linden Division	Holyoke, Mass.
	French Paper Company	Niles	Michigan
	Central Fibre Products Co.	Tama	Iowa
	Crown Zellerbach Corp.	Crown Willamette Paper Co. Division	Lebanon, Ore.
	Fort Orange Paper Company	Box Board Mill	Castleton on Hudson, N. Y.
	American Writing Paper Corp.	Nonotuck Division	Holyoke, Mass.
	Rayonier Incorporated	Shelton Division	Shelton, Wash.
	Spaulding Fibre Co., Inc.	Milton	New Hampshire
	International Paper Company	Webster Mill	Orono, Maine
	United States Gypsum Company	N. Kansas City	Missouri
	Rising Paper Company	Housatonic	Massachusetts
	American Writing Paper Corp.	Mt. Tom Division	Holyoke, Mass.
	Terre Haute Paper Co.	Mill No. 2	Terre Haute, Ind.
	Central Fibre Products Co.	Vincennes	Indiana
	Central Fibre Products Co.	Mt. Carmel	Illinois
	Rogers Fibre Co., Inc.	Fibreboard Mill-Div. 1	Bar Mills, Me.
	Hollingsworth & Whitney Co.	Arcostook & Cobbossee Mills	Gardiner, Me.
	The Mead Corporation	Nashville	Tennessee
	International Paper Company	Riley No. 23	Riley, Maine
	Hollingsworth & Whitney Company	Abenaquis Mill	Madison, Me.
	Ponds Extract Company	Seymour	Connecticut

PERFECT SCORE
Division II—Paper and Board Re-Manufacturing

Union Bag & Paper Corp.	Specialty Bag Factory	Hudson Falls, N. Y.
Container Corp. of America	Chicago	Illinois
Barber Asphalt Corp.	Madison	Illinois
Fort Orange Paper Co.	Paper Box Plant	Castleton on Hudson, N. Y.
F. J. Kress Box Company	Pittsburgh	Pennsylvania
Bird & Son, Inc.	Chicago	Illinois
The Container Company	Van Wert	Ohio
Kimberly-Clark Corp.	Atlas Mill	Appleton, Wis.
Container Corp. of America	Anderson	Indiana
Gaylord Container Corp.	Dallas	Texas
Gaylord Container Corp.	Houston Plant	Houston, Texas
Bemis Brothers Bag Company	East Pepperell	Massachusetts
Bird & Son, Inc.	Shreveport	Louisiana
Bay West Paper Company	Green Bay	Wisconsin

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P- 18	7	1	2.948
	P- 19	8	1	4.299
	P- 64	9	1	4.982
	P- 1	10	3	5.995
	P- 70	11	2	6.440
	P-136	12	2	6.548
	P- 44	13	2	7.086
	P- 13	14	2	7.296
	P- 28	15	5	7.689
	P- 30	16	2	8.037
	P- 21	17	2	8.796
	P- 12	18	2	8.960
	P-140	19	3	9.084
	P- 73	20	5	11.909
	P-130	21	3	14.885
	P- 9	22	7	15.559
	P- 69	23	5	16.127
	P- 84	24	6	17.186
	P- 71	25	4	17.525
	P-126	26	11	18.450
	P- 67	27	7	18.482
	P-102	28	6	21.553
	P-114	29	6	23.376
	P- 27	30	15	30.804
	P- 40	31	10	30.906
	P-156	32	10	32.522
GROUP B	P-127	12	1	5.453
	P-107	13	2	5.502
	P- 68	14	1	5.696
	P- 3	15	1	5.788
	P- 26	16	1	5.917
	P-135	17	1	6.149
	P-142	18	1	6.691
	P- 58	19	1	7.573
	P-145	20	1	7.642
	P- 60	21	2	10.870
	P-120	22	2	12.149
	P- 45	23	2	12.578
	P-137	24	2	14.509
	P- 23	25	4	20.393
	P- 2	26	4	22.398
	P- 59	27	4	26.330
	P- 54	28	4	27.133
	P-104	29	4	28.376
	P-153	30	8	50.033
GROUP C	P-119	11	1	9.212
	P- 56	12	1	10.757
	P-100	13	1	13.037
	P- 55	14	1	13.507
	P-103	15	1	15.967
	P-124	16	2	16.693
	P-113	17	2	19.113
	P-143	18	3	26.935
	P- 34	19	2	27.759
	P- 41	20	3	29.385
	P- 17	21	2	31.605
	P- 48	22	3	40.266
	P- 29	23	5	49.408
	P-111	24	5	52.381
	P- 43	25	4	53.182
	P-158	26	7	99.115
GROUP D	P-157	28	1	19.234
	P-146	29	1	20.877
	P-125	30	1	22.015
	P- 42	31	1	24.358
	P- 98	32	1	25.536
	P-151	33	1	31.051
	P- 65	34	1	38.357
	P- 14	35	2	39.093
	P-106	36	2	42.826
	P- 49	37	2	46.748
	P-117	38	2	48.216
	P-147	39	1	52.944
	P- 99	40	2	57.600
	P-134	41	3	66.888
	P- 47	42	2	69.082
	P-116	43	4	70.728
	P- 50	44	2	75.574
	P- 81	45	5	108.876

Division II—Paper and Board Re-Manufacturing

R-23	15	1	5.925
R- 2	16	1	7.173
R-35	17	1	7.479
R-27	18	1	12.048
R- 6	19	2	16.703
R-19	20	1	16.848
R-21	21	2	19.157
R-34	22	3	20.711
R-28	23	2	21.288
R- 1	24	4	24.607
R-37	25	3	25.942
R-36	26	2	26.247
R-26	27	3	36.274
R-32	28	1	39.888
R-31	29	5	62.242
R-11	30	2	75.913

July report missing—covers 1 month only: International Paper Co., Palmer, N. Y.

August report missing—covers 1 month only: Berst-Foster-Dixfield Co.; Rising Paper Co.; Terre Haute Paper Co.; P-47; Ponds Extract Co.; P-50; Bemis Brothers Bag Co.; R-6.

July-August reports missing: F-32; P-82; P-101.

ROBERTSON CO. EMPLOYEES GET SERVICE AWARDS

In recognition of their periods of service ranging from five to thirty-five years, 79 men and women employees of the Robertson Paper Box Company, Montville, Conn., were recently presented with service emblems by Ralph A. Powers, president of the company.

James B. McFarlane, dean of the Robertson employees, received a 35-year emblem, while C. Alfred Johnson and John Chop received 25-year emblems. Harry W. Schwartz, production manager of the company, made the presentation talk which accompanied the award of a 15-year emblem to Mr. Powers. The occasion for the presentation was the Robertson Company's eighth annual outing held September 10.

The Robertson firm's emblem plan has been worked out on a basis of five years or multiples of five. Anyone with the company from five to nine years inclusive receives a five-year emblem—from ten to fourteen years inclusive, a ten-year emblem, etc. It is expected that as employees progress from one time-group to another, additional emblems will be awarded. The emblems are made of gold and enamel.

◆

▶▶▶ THE NATIONAL FOREIGN TRADE COUNCIL, Inc., is preparing to conduct a number of group discussion meetings at the annual National Foreign Trade Convention to be held at Hotel Commodore in New York, October 31 to November 2. One of these group meetings will be devoted to the foreign trade interests of the machinery industry. In addition, there will be a session on reciprocal trade agreements.

STOP THOSE LEAKS!

Use Garlock 22

Left—GARLOCK 122 Gaskets, cut from GARLOCK 22 Sheet. *Above*—GARLOCK 22 Red Rubber Sheet Packing. Supplied in thicknesses from 1/32" up to and including 1/4". Standard width of sheet is 40".

ARE leaky joints a problem in your plant? Do you hear a *drip . . . drip . . . drip* . . . here and there? Stop those leaks on your hot or cold water and saturated steam joints with gaskets cut from GARLOCK 22 Red Rubber Sheet Packing. Made of finest materials, scientifically compounded, GARLOCK 22 gives long, dependable service at pressures up to 150 lbs. per square inch.

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PALMYRA, NEW YORK

In Canada: The Garlock Packing Co. of Canada Ltd., Montreal, Que.

GARLOCK

A Beauty Secret

for Pulp and Paper

To be at their best pulp and paper must come through clean — free from stain and discoloration caused by rust and other impurities. Make sure your products look their best by processing them in equipment made of Armco Stainless Steel.

Here is a metal that gives pulp and paper every advantage. No spoiled batches from stains, or paper stock damage caused by corrosion. Armco Stainless is strong, hard-surfaced and highly resistant to chemicals used in pulp and paper production. Also important to you is the longer life and reduced maintenance costs it assures!

There is a correct grade of Armco Stainless Steel for every pulp and paper mill requirement. We'll gladly help you select and apply it to your purpose. Write us. The American Rolling Mill Company, Executive Offices: 1001 Curtis St., Middletown, O.

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STAINLESS STEELS

"UNION BAGGERS" WIN 36 STRAIGHT

A world's record for consecutive wins was set recently by the "Union Baggers," semi-professional baseball team of the Union Bag and Paper Corporation of Savannah, Ga., when they ran up a string of 36 victories without a defeat during the present season. The former world's record, also held by a Georgia team, was 33 games.

In recognition of the fine baseball the team has played this season, James H. Allen, vice-president and general manager of the Savannah plant, gave the team a banquet at one of the local hotels, at which time a watermelon weighing 130 pounds was cut and served. The record of the consecutive games won is for any class of baseball as far back as the record goes, it was brought out.

Mr. Allen spoke briefly at the banquet, stressing the fact that good clean sport helps to create an additional interest in a man's job. It was brought out at the meeting that athletics play a big part in the recreational life of the employees of the company. The company has constructed a regulation baseball park where athletic events are staged throughout the year.

The "Union Baggers," championship team of the Union Bag and Paper Corporation at Savannah, Georgia.

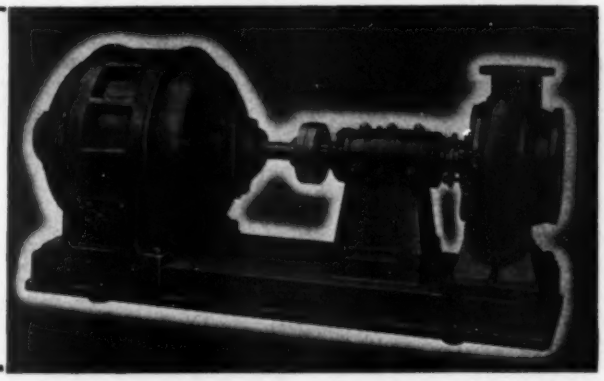
COMING EVENTS

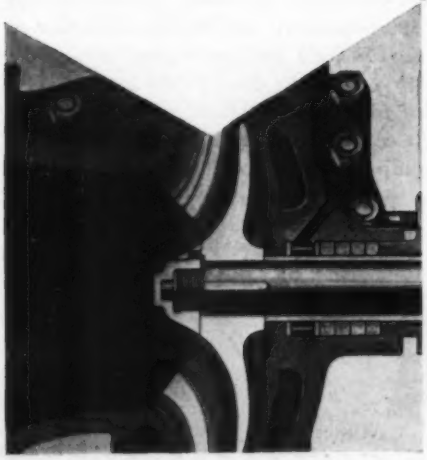
Oct. 10-14—National Safety Congress, Stevens Hotel, Chicago.
Oct. 15—American Pulp and Paper Mill Superintendents Association, Connecticut Valley Division Meeting, Roger Smith Hotel, Holyoke, Mass.
Oct. 21-22—American Pulp and Paper Mill Superintendents Association, Northwestern Division Meeting, Madison, Wisconsin.
Oct. 28-29—American Pulp and Paper Mill Superintendents Association, Southeastern Division Meeting, Virginian Hotel, Lynchburg, Virginia.

TAKE ACCOUNT OF STOCK

and pump it

with **WARREN PUMPS**





It takes more than a good stock pump to handle heavy stock. It takes a good pump *built to fit the job*. Warren recommendations are based on the right pump for *your* particular requirements. Inlet nozzles are calculated to assure high density stock reaching the impeller. The number of blades in the impeller, the shaft diameters, sizes of bearings —all these details are *right*. Moreover, all Warren stock pumps have the self-cleaning, non-binding impeller that prevents stock from packing and jamming the pump. When stock handling problems come up, bring them to Warren.

WARREN PUMPS WARREN STEAM PUMP CO., INC.

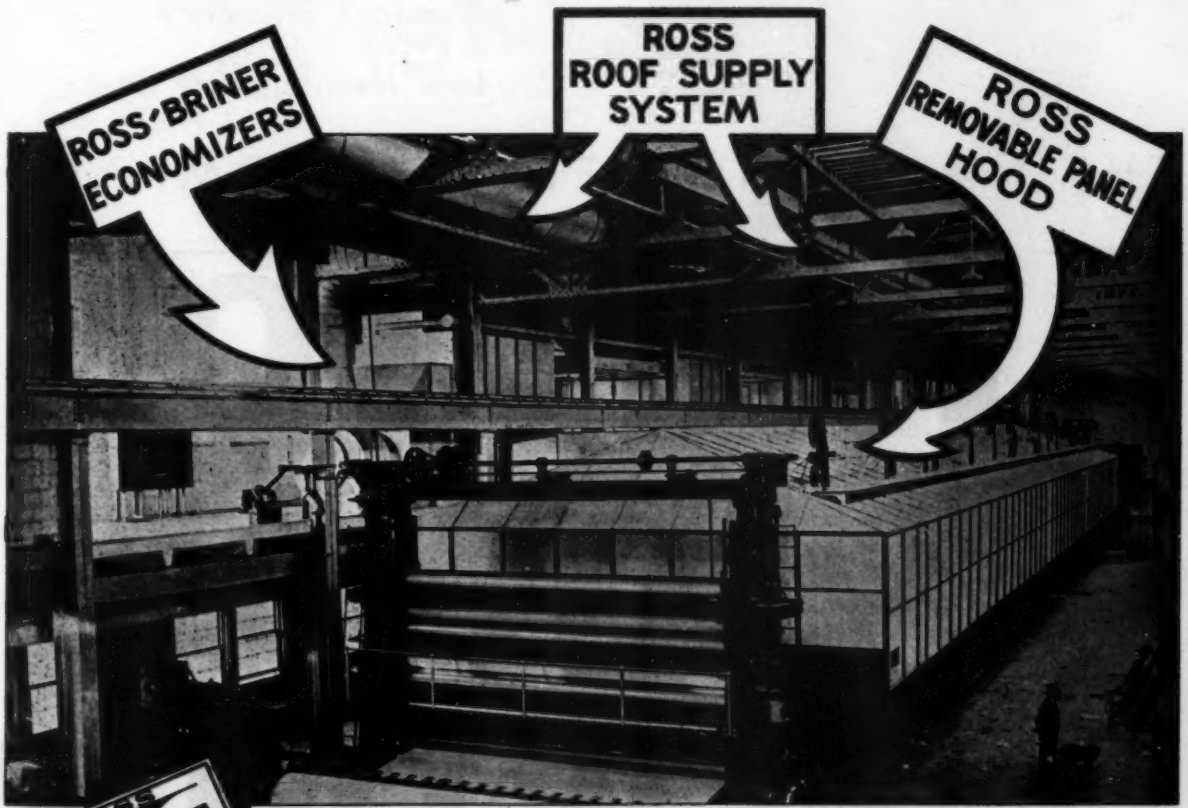
WARREN, MASSACHUSETTS, U. S. A.

HEATING AND VENTILATING THAT INSURES

real machine-room efficiency!

By real efficiency is meant maximum production and quality of product from the machine without difficulties due to drip and without excessive costs for power and steam. Ross equipment to insure such efficiency is designed in each case for the individual requirements. In the machine room illustrated, Ross-Briner Economizers are located on a balcony and directly connected to the Ross Machine Hood.

More than 80% of all mills have installed Ross apparatus to solve some particular production problem — Ross-Briner economizers to recover heat units from waste vapor, Vapor Absorption Systems, High Pressure Ventilation, Machine Hoods, Roof Supply and Exhaust Systems. Recommendations for remodelling existing systems will be gladly furnished by our engineering staff with more than a quarter century of experience. Write to our office nearest to you.



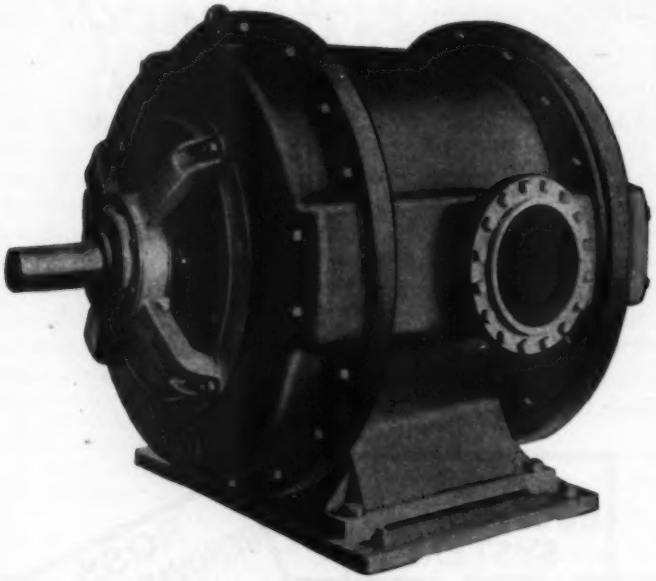
J.O.ROSS ENGINEERING CORPORATION

Main Office—350 MADISON AVENUE, New York

201 North Wells St. CHICAGO, ILL. | 12953 Greeley Ave. DETROIT, MICH. | 2860 N. W. Front Ave. PORTLAND, ORE.

ROSS ENGINEERING OF CANADA, LIMITED, Dominion Square Building, Montreal

ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES.



One Moving Element
Non-Pulsating Vacuum
No Internal Wearing Parts
No Internal Lubrication
Handles Liquid With Air
No Expert Attendance
Constant Efficiency
Low Maintenance Cost

THE NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

APPLETON

wires are **GOOD**

MONO-PLANE WEAVE
PHOSBLOY WIRES
APP-WELD

WIRES

APPLETON WIRE WORKS. INC.
APPLETON, WISCONSIN

CENTRIFUGALLY CAST

SANDUSKY
ROLL SHELLS—ROLL COVERS

● This 22 ton bronze shell is for a high speed news machine. Sandusky makes shells of any thickness and length in any diameter from 3"-46". Rolls made with Sandusky shells make better paper at less cost because they stay smoother and wear longer. They stay in shape and stay in balance. Whenever you need small rolls or large rolls—light rolls or heavy rolls—specify Sandusky Centrifugally Cast. Furnished in bronze, brass, copper, Monel Metal and cast iron alloys.

●

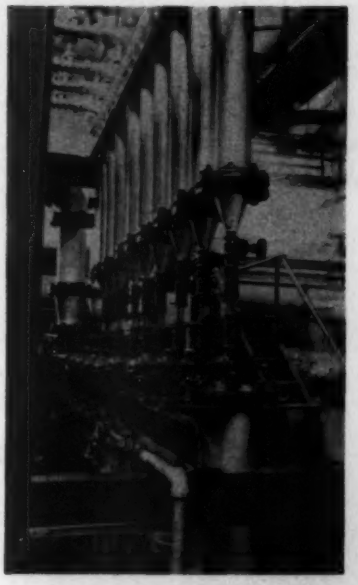
Write for Illustrated Bulletin No. 537

Sandusky Cast is PRESSURE CAST

Sandusky Foundry & Machine Company

Users say—

"A Simple and Economical Means of Keeping Paper Stock Clean"



Vortrap installation in the screen room of a paper mill.

VORTRAPS which have been installed in mills for removing grit, sand, scale, sawdust and similar materials from paper making stock have proven efficient and economical because—

VORTRAPS were developed by men actively engaged in paper making. . . . The result is an apparatus employing the principle of centrifugal action—without internal moving parts—practically eliminating maintenance expense.

VORTRAPS operation is continuous. . . . Accumulated dirt in the receiver is removed whenever necessary without interfering with either the Vortrap or the paper making machine.

Write today for data on Vortrap operation

NICHOLS
ENGINEERING & NERCO RESEARCH CORP.
60 WALL TOWER NEW YORK, N. Y.

ELIXMAN

CAPS — Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

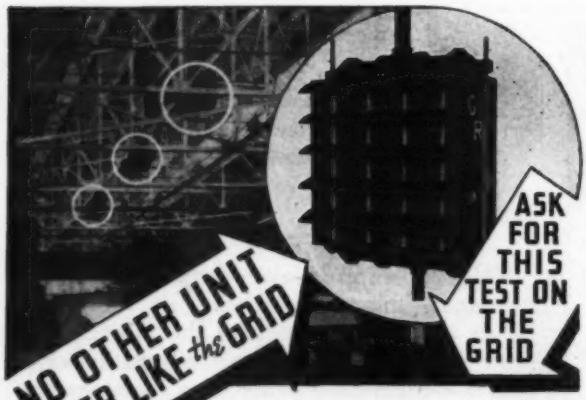
Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with re-enforced square hole. This patented feature of re-enforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, Inc.
CORINTH, N. Y.



The GRID Unit Heater is a permanent piece of heating equipment that can be depended on to function year after year without trouble or attention. A RECENT BREAKDOWN TEST AT PITTSBURGH ON A GRID SECTION TAKEN FROM STOCK RESULTED IN FRACTURING THE SECTION AT 2800 POUNDS HYDROSTATIC PRESSURE PER SQUARE INCH. This shows that our claims for Grid stability are correct, and why maintenance cost of GRID Unit Heaters is eliminated. What other unit heater has such a record?

Grid is trouble free because it is not affected by electrolytic action. In it are no dissimilar metals in contact with steam or hot water to produce electrolytic action. THE FIRST GRID UNITS MADE IN 1929 ARE STILL IN USE—WITH MANY YEARS OF SERVICE YET AHEAD OF THEM. Write for complete details.

D.J.Murray Mfg. Co.
WAUSAU ~ WISCONSIN.

TWO GOOD WAYS TO

S-T-R-E-T-C-H

FELT LIFE

FIRST:—Insist on felt cleaning that is thorough, that leaves felts soft and absorbent so that they will not fill up quickly. In this way you avoid too-frequent cleaning . . . avoid unnecessary wear.

SECOND:—Use a cleaning material that is easy to rinse out . . . that cleans *gently* . . . that does not damage fibres.

TO SUM UP: Clean felts the *Oakite way* . . . the one way that meets *both* these requirements . . . that actually STRETCHES felt life . . . and felt cleaning dollars.

WRITE FOR FULL, FREE INFORMATION.

Manufactured only by
OAKITE PRODUCTS, INC., 16 Thames St., NEW YORK, N.Y.
Branch Offices and Representatives in All Principal Cities of the U. S.

OAKITE *Certified* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING NEED

LOOK FOR THIS

Mark of Quality

on

FELTS

It's your assurance of service, design, finish, uniformity, dependability. Complete details upon request.

APPLETON WOOLEN MILLS, APPLETON, WIS.

OTHER COUNTRIES

BRITISH NOTES

Imports and Exports

The heavy decline in the importation of manufactured paper and boards which has persisted despite the increase during the early part of 1938, is now making itself felt throughout Great Britain. Imports during the period from January to July of this year totaled 578,281 tons, as compared with 708,205 tons for the same period last year. Exports have declined also. During the January-July period this year, totals were 101,412 tons, as against 124,266 tons for the same period in 1937. The same discrepancy was noted in the importation of papermaking materials, importations for the January-July period this year running 1,134,455 tons against the 1937 total for the first part of the year of 1,192,335 tons.

Esparto Situation

Further difficulties have arisen with regard to future supplies of esparto grass. It will be recalled that this grass is an important papermaking material to the British paper trade and that last year some consternation was caused by the news that the concessions were being purchased at a high price by one buyer, with the alleged intention of forcing the papermakers to purchase their supplies through this one channel at enhanced prices. For some unknown reason, this move has failed, and now it is suggested that a restrictive export should be arranged.

River Pollution

It has been a long time since any member of the paper trade has had to answer a charge of river pollution, but recently a Scottish papermaker was charged under the Salmon Fisheries (Scotland) Act. The chief witness for the defense submitted details of the mill's soda recovery plant and a verdict of "not proven" was declared. The present plant was installed only three years ago at a cost of about £10,000.

Pulp Production

That the position in the pulp-producing countries has not improved during recent months is evidenced by the latest agreement between the sulphite pulp producers in Finland, Norway and Sweden. By this agreement the mills concerned will be closed for eight weeks during the last five months of this year, and a further seven weeks before the end of July next.

This may have an important bearing on the subject of future prices. The price position in Great Britain is, at the moment, very peculiar. The mills having agreements—that is, the convention mills—are adhering strictly to their convention prices, with no intention of lowering these, for the simple reason that costs of production are still high and it is realized that lower prices would not result in more business. Rather than reduce their prices, they are closing down for odd periods. The non-convention mills, whose prices are slightly lower than the convention mills, are full with orders. If the convention mills lower prices to capture non-convention business, the latter will retaliate with still lower prices. It is hoped that the fall season will bring sufficient business to put all mills on a fairly good footing. If this does not materialize, it is the general opinion that something is going to break. In any case there is expected to be a general readjustment of prices in January. Everything depends upon the autumn outcome over which the most important influence will be the European political situation.

Harrison Re-Enters British Paper Field

The re-entry of William Harrison into the British paper industry since his severance with the Inveresk Paper Company has been one of the most interesting features of the past few years. His activities are centered in Wales, where his latest enterprise is the opening of the British Coated Board and Paper Mills in one of the largest buildings of its kind in the country. The peculiar aspect of the situation is that the coating mills already existing are considered to be sufficient to cover consumer needs and according to reports this new mill will add a further 100 tons per week to the general output.

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▶▶▶ A NEW PAPER MILL may be erected in the Union of South Africa shortly. A British engineer who, for the past three years, has been studying the question of producing kraft paper in that locality, has been successful in finding a suitable raw material.

ITALIAN NEWS

New Cellulose Plant

A new plant for the production of cellulose is now being constructed at Chieti, it was reported recently. The plant, a unit of the Iri-Burgo group, will produce cellulose from straw, corn and rice and will use the Pomilio process. Further supplies of small poplars and other trees are now becoming available to agriculturists whose job it is to increase the acreage of trees for cellulose production. The "National Corporation for Cellulose" has placed these trees at the disposal of agriculturists for the cost of transportation only.

Plan Production

The Italian Ministry of Corporations met recently with the "Corporation for Paper and Printing" in order to examine the paper situation. Demands were made for the installation of a new mill for the production of cellulose, paper and paperboard. The most important question was in relation to Italy's national economic independence in this field. It is expected that plans will be made to further increase production. At the meeting, the "Cartiera Valle Olona," Milan paper mill, was authorized to equip its plant for increased cellulose production.

Cellulose Booklet

The examining commission of the recent contest in Italy regarding a book on cellulose, judged a work on the subject by Giovanni Cesconi to be the best of all those entered. Mr. Cesconi received the award of 5.000 lire from the "National Corporation for Cellulose and Paper."

◆

FRENCH GROUP PLANS TRADE WITH CANADA

A scheme whereby French "quality" merchandise could be exchanged for Canadian newsprint, is the plan of Vicomte de Brimont, representative of a large chain of French provincial newspapers. The French business man has been spending some time in Montreal studying Canadian commercial conditions. At the present time, newsprint in France, obtained chiefly from the Soviet Union and Norway, is more expensive than anywhere else in Europe.

The organizations in which the Vis-

"You Can Take It For Granted"—

SOLVAY
Liquid Chlorine

IS ALWAYS STANDARD!

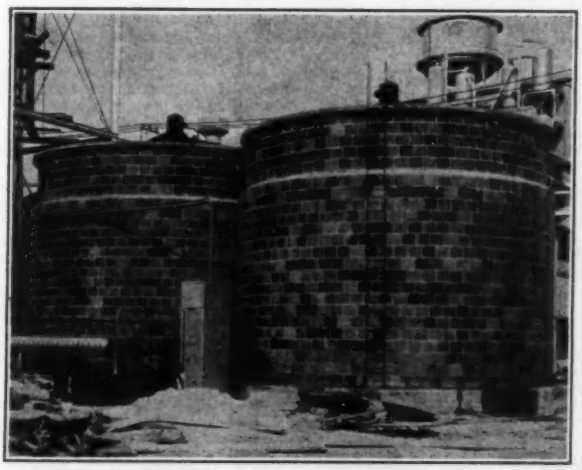
When a Company has maintained the most rigid of production standards over a period of 55 years . . . you can rely upon its name and on its products! Scientific methods . . . exacting supervision have made SOLVAY LIQUID CHLORINE a bleaching agent on which you can depend . . . that you can take for granted will be always pure, always uniform, when you receive it!

And when you place your order with Solvay for LIQUID CHLORINE . . . SODA ASH . . . CAUSTIC SODA . . . you are guaranteed fast, sure, on-time deliveries. You are relieved of worry, of check up . . . time spared for your own problems.

Write for full information and prices. Ask for free copy of 44-page book "SOLVAY LIQUID CHLORINE."

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 RECTOR STREET NEW YORK

Kalamazoo for TANKS

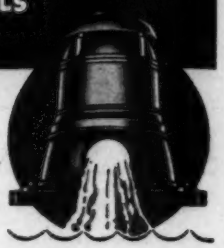


One of two sets of Vitrified Glazed Tile stock chests installed at Brunswick Pulp & Paper Mill, Brunswick, Ga. They are 24 feet in diameter inside and stand 20 feet high.

Kalamazoo Vitrified Glazed Tile Tanks for stock chests, machine chests, etc., are clean, strong, permanent, and give you freedom from maintenance cost. Write for complete information.

KALAMAZOO TANK & SILO CO.
KALAMAZOO, MICHIGAN

IT TAKES Plenty of Water
TO MAKE FINE INDUSTRIAL CHEMICALS



THE FOUR gravel wall wells installed by the Layne Louisiana Company at the Lake Charles, Louisiana, Mathieson Alkali Plant have scored another Layne victory. After nearly five years of continuous 24 hour service, not even so much as the turn of a wrench has been required. Such records of efficiency are not unusual with Layne water-producing systems.

This company's well water requirements are furnished by FOUR Layne Gravel Process Wells and four Layne High Efficiency pumping units, with a combined capacity of 6,500,000 gallons daily.

AFFILIATED COMPANIES

LAYNE-ARKANSAS CO., STUTTGART, ARK.
LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
LAYNE-CENTRAL CO. . . MEMPHIS, TENN.
LAYNE-NORTHERN CO., MISHAWAKA, IND.
LAYNE-LOUISIANA CO., LAKE CHARLES, LA.
LAYNE-NEW YORK CO. . NEW YORK CITY, AND PITTSBURGH . . . . . PA.
LAYNE-NORTHWEST CO., MILWAUKEE, WIS.
LAYNE-OHIO CO. . . . COLUMBUS, OHIO.
LAYNE-TEXAS CO. . . . HOUSTON AND DALLAS . . . . . TEXAS.
LAYNE-WESTERN CO., KANSAS CITY, MO., CHICAGO, ILL., MINNEAPOLIS, MINN., AND OMAHA . . . . . NEBRASKA.
LAYNE-BOWLER NEW ENGLAND COMPANY, BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD., LONDON . . . . . ONTARIO, CANADA

The selection of Layne Wells and Pumps by such an outstanding firm as The Mathieson Alkali Works is a splendid compliment to the fine quality and efficiency of Layne Wells and Pumps.

Layne Wells and Pumps serve all kinds of Industries and Municipalities, not only in the United States, but throughout the world, and from the smallest to the largest in each field. And wherever installed, they always win enthusiastic praise. For literature and basic facts on their excellent features, write LAYNE & BOWLER, INC., Dept. P, Memphis, Tenn.

LAYNE

PUMPS & WELL WATER SYSTEMS
For Municipalities, Industries, Railroads, Mines and Irrigation

count is interested are planning to open a bureau in Paris to supply information to French business men wishing to export to Canada. Another office is planned for Montreal. Efforts of the French exporters will be directed primarily to trade in luxury goods—wines, cosmetics, etc.—which do not compete with Canadian or British manufactures.

◆

MAY ERECT THREE NEW PULP MILLS IN YUGOSLAVIA

Plans are now in progress for the erection of three wood pulp mills in Belgrade, Yugoslavia, it was reported recently. The investment, still in the tentative stage, will amount to 200,000 dinars (about $4,600,000) and the mills, if erected, will be located in Bosnia, Lika and Slovenia. The entire production of these mills will be manufactured for export. Yugoslav interests hope to replace Austria as the supplier of wood in the Italian and French markets.

◆

▶▶▶ SWEDISH MANUFACTURERS expect to supply equipment to the newly-formed Manchou Soya Bean Stalk Pulp Company organized in Manchuria for the purpose of producing pulp from soya bean stalks and hulls for the manufacture of rayon. The plant is being erected in Kaiynan, Manchuria, and will begin operations February 1, 1939, it is reported. It will produce 20,000 tons annually, with an eventual production of 200,000 tons.

AUSTRALIAN FIRM BUYS NEW UNITS

Australian Paper Manufacturing, Ltd., Princes Bridge, Australia, recently purchased a complete stock preparation system for the production of paperboard from the Dilts Machine Works, Fulton, N. Y., in collaboration with the James L. Carey Co. of Chicago.

The plans, as accepted, call for a 100-ton breaker beater system with the latest type of equipment, including the Dilts-built Cowles Classifiner. The system will handle stuff as well as trash of every nature without clogging or delaying production. Rejects will be handled at a very thin consistency.

The Australian firm is also augmenting its present system in its Sydney (Australia) plant with a Cowles Classifiner.

New Catalogues and Publications

Bausch & Lomb Optical Co., Rochester, N. Y.—Of interest to many will be this new booklet (D-16) on the company's microtomes and accessories. Replete with photographs, this release explains the construction and usages of clinical microtomes, automatic laboratory microtomes, the Minot rotary microtome, the Minot automatic precision microtome, and the Thomas-Jeffrey microtome. Full specifications are given for these precision cutting instruments. Price lists are included in the release.

Cleveland Tramrail, Wickliffe, Ohio—An interesting folder illustrating the various ways in which this company's materials handling system is employed, has been released lately by this firm. Included among the photographs is one showing equipment in use at a bag mill.

DeLaval Steam Turbine Co., Trenton, N. J.—Now available from this firm is a reprint of a paper presented before the American Society of Mechanical Engineers entitled "Sewage Pumps." The paper, presented by the company's Mr. Peterson of the Pump Department, discusses the designing of centrifugal pumps to handle liquids carrying solids in suspension, such as unscreened sewage and wood pulp.

Flexrock Co., Philadelphia, Pa.—Non-slip wax for factories, offices, homes, schools, public buildings, etc., is the subject of a little folder recently issued by this company.

Foxboro Co., Foxboro, Mass.—A new 7-page bulletin issued by this company contains information and illustrations pertaining to recording gauges and accessories. The importance of spring construction, with particular reference to the all-welded steel helical movement, the diaphragm spring movement, the spiral spring movement and the Bourdon spring movement, is stressed.

Laclede-Christy Clay Products Co., St. Louis, Mo.—A very attractive and well laid out brochure illustrating and stressing the importance of refractories and how they play a vital part in industry, has been published lately by this firm. The brochure presents a graphic story of the history of the company and illustrates by written material and photographs the structure of the business, its selling facilities, plant locations, etc. This release contains many interesting features regarding the company's product.

Leeds and Northup Co., Philadelphia, Pa.—A new 8-page catalogue describing the thermionic amplifier for pH and other potential measurements in high resistance circuits has just been released by this company. The release is well illustrated and explains, in a clear manner, the adaptability of the amplifier thus described.

Oakite Products, Inc., New York, N. Y.—Modern methods for effectively handling the many necessary cleaning operations in conjunction with present day automotive fleet maintenance and truck motor repairing are fully described and illustrated in an interesting 36-page booklet recently released by this firm.

Joseph T. Ryerson & Son, Inc., Chicago, Ill.—A handsome pictorial booklet illustrating by means of true color photographs, a number of applications of Allegheny Stainless Steel, has been published recently by this firm.

Sullivan Machinery Co., Michigan City, Ind.—An attractive 20-page catalogue describing and illustrating this company's Unitair stationary and semi-portable air compressors, has been issued recently by this company. The bulletins describes the refinements and improvements made to this line of compact, two-stage, air-cooled compressors.

Texas Co., New York, N. Y.—A very informative booklet on ball and roller bearing lubrication has just been put out by this firm. Containing many illustrations, this 42-page release covers such subjects as bearing constructional features, lubrication of anti-friction bearings, types of lubricants, protection of lubrication, application of lubricants, etc. The booklet is extremely well written and so well planned and laid out as to give the reader a thorough understanding of the content.

BOOKS

Blue Book of Southern Progress, 1938—This book, containing pertinent statistical information on the South and consisting of 82 pages and cover, has been released recently by Manufacturers Record, Baltimore, Md. It is divided conveniently into the following major sections: Manufacturing, agriculture, mining and minerals, construction, transportation, power, foreign trade, banking, insurance, area and population, state officials and important commissions, and an economic summary including one for the United States, another for the South as a whole, and a third for the South by states. Priced at fifty cents per copy by the publisher, the book should be valuable as a reference to any one in position to utilize such information as it contains.

Trade Standards of Compressed Air Institute.—This new 112-page book issued by the Compressed Air Institute, contains a great deal of interesting material relative to the employment of compressed air in an industrial capacity. The wire-bound book is more than double the size of the previous edition, and includes considerable data regarding the subject at hand. It is divided into two parts. Part I covers such pertinent points as definition of terms, nomenclature and terminology, rating standards and guarantees, test standards, installation and care of compressors, lubrications, data, tables and formulae and some uses of compressed air. Part II takes in reciprocating compressors and vacuum pumps (stationary type), rotary compressors and vacuum pumps, centrifugal compressors and exhausters, compressor accessories, portable compressors, rock drills and accessories, pneumatic tools and accessories. This book, the fifth edition, is complete in every detail and gives a very inclusive picture of the uses, adaptations and care of compressed air equipment. There are numerous diagrams, drawings and tables, all of which serve to clarify the reader's understanding of the subject of compressed air. Copies of the book may be obtained from the Compressed Air Institute, 90 West Street, New York, N. Y. Price is $1.00, plus postage.

United States Pulp and Paper Industry.—This extremely interesting publication, issued by the United States Department of Commerce, is so written as to give the reader a general perspective and understanding of the pulp and paper industry as it has grown and as it exists today. It is likewise designed, through its use of reference data, to provide the pulp and paper manufacturer, the importer and the exporter, with production, import and export facts. Much of the data is carried back on a comparative basis to 1899. This 99-page book carries chapters on the history of the industry, its economic status, its location, manufacturing methods, distribution methods, foreign trade, etc. There are 41 tables included in the volume. These tables show pulpwood consumption, wood pulp and paper production, wood pulp imports, and imports of newsprint and other types of paper. So well written is this book that every pulp and paper executive will want a copy. It may be obtained from the Superintendent of Documents, Washington, D. C. Copies are 15 cents each.

RECORD 2-WAY (2 PORTS) AND 3-WAY (3 PORTS)
"CLEAR-WAY" BALANCED GATE THICK STOCK VALVES
"IMPROVED TYPES"

FOR PAPER AND PULP MILL SERVICE

LEVER OR WORM GEAR OPERATED—SIZES 3" UP
METALS—ALL IRON, I.B.B.G., ALL BRONZE

12"—3 WAY—Fig. 401, Lever Operated

The "Improved Types" with balanced gates, while maintaining the same design of passageways through gate and valve as the older types, have taper gates to make operation more easy, take up wear and allow slight adjustment for hot stock. Face to face dimensions as older types. Self indicating and packings lubricated.

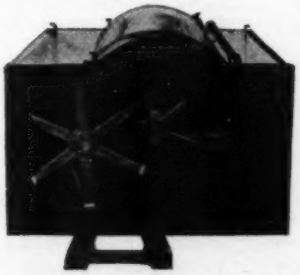
RECORD FOUNDRY & MACHINE COMPANY
LIVERMORE FALLS, MAINE, U. S. A.

The A. D. Wood Machine

PULP THICKENER — WASHER — SAVEALL
and WATER SCREEN

No Couch Roll or Doctor. Handles variable flows and consistencies. Equipped with patented Double Sealing Collars. Rubber covered or stainless steel construction. Efficient, economical and practically automatic.

Over 30 installed in 1937.

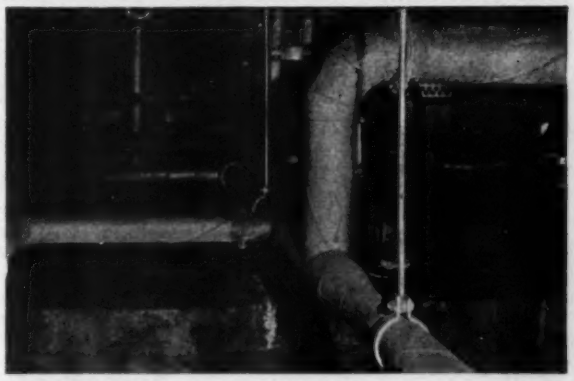


GLENS FALLS MACHINE WORKS, Inc.
GLENS FALLS, N. Y.

Ask for descriptive Bulletin

ONE PIPE

SOLVED BOTH PROBLEMS



WHITE WATER LINE—This mill saved the cost of extra flanges, simplified erection and reduced chances of joint leakage—all by specifying Armco Spiral Welded Pipe "shop-fabricated" to fit their layout. They also obtained a neat, clean installation that will serve for years because it's made of time-proved ARMCO Ingot Iron — galvanized after fabrication.

WATER SUPPLY LINE—Costs on this job were greatly reduced by using 40-foot lengths of Armco Spiral Welded Pipe. This strong flexible pipe joined with Dresser couplings eliminates the danger of leakage or sudden rupture. Moreover, its bitumastic coating and lining assures increased flow capacity and added years of low-cost service.

To determine where and how Armco Spiral Welded Pipe can simplify your piping problems, write for free bulletin #337. The American Rolling Mill Company, Pipe Sales Division, 3441 Curtis Street, Middletown, Ohio. District offices in all the principal cities.

ARMCO

ARMCO

SPIRAL WELDED PIPE

PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Paper Handling Machine

Patent No. 2,124,855. Reuben Hitchcock, Cleveland, Ohio, assignor, by mesne assignments, to Dexter Folder Company, New York, N. Y., a corporation of New York. Application October 10, 1928, Serial No. 311,463. 5 Claims. (Cl. 271—52). In a paper handling machine, a feed table having a side guide, said table comprising diagonally arranged driven rollers adapted to cause travel of sheets thereon longitudinally and towards said side guide, a series of rolling weights mounted in said side guide and supported by said rollers, whereby the travel of the sheets themselves rotates the weights, and a sheet feeder for delivering sheets to said table in a direction parallel to said side guide, said sheet feeder being adjustable toward and away from said table and adapted to release control of each sheet immediately after it is engaged by the first of said rolling weights.

Cork Treated Paper Pulp

Patent No. 2,121,703. Louis Leonard Larson, Wilmington, Del., assignor to Krafelt Corporation of America, Wilmington, Del., a corporation of Delaware. Application March 7, 1935, Serial No. 9,901. 8 Claims. (Cl. 92—21). A process for causing substantially uniform distribution of comminuted cork into paper pulp which comprises forming a dispersion of the cork in water containing a wetting agent and a dispersing agent, and intimately mixing the dispersion with the paper pulp.

Method of Packaging Paper

Patent No. 2,119,956. Francis S. McDonnell, Milton, Mass. Application February 3, 1937, Serial No. 123,809. 6 Claims. (Cl. 93—2). The method of packaging paper on a skid which comprises successively placing and wrapping in situ fractional portions of the complete stack of paper one above another until the stack is completed, and then binding said wrapped portions together and to said skid.

Art and Machine for Working Paper

Patent No. 2,124,582. Douglas M. McBean, Canajoharie, N. Y., assignor, by mesne assignments, to The Paper Service Company, Lockland, Ohio, a corporation of Ohio. Application February 1, 1933, Serial No. 654,588. Renewed October 18, 1937. 12 Claims. (Cl. 154—30). In a paper working machine a movable paper gripping surface with a multiplicity of longitudinal grooves formed therein, a plurality of sheaves journaled in close proximity to said movable gripping surface, cords or gripping bands carried by said sheaves and maintained respectively in said grooves, means for supplying paper stock between said sheaves and the movable surface to be engaged between said cords and said movable surface and means for driving said drum and sheaves to progressively convey the paper stock between the cords and movable surface to form longitudinal corrugations in the stock, said cords being formed of a continuous cord, means for distributing the loops of the cord to and from the respective sheaves, and a single means for maintaining the desired tension on said cord.

Apparatus for Determining the Opacity of Paper and Other Materials

Patent No. 2,125,639. Otto Maass, Montreal, Quebec, and Ronald E. Richardson, Oshawa, Ontario, Canada, assignors to The Canadian Pulp and Paper Research Corporation, Montreal, Quebec, Canada. Application October 16, 1935, Serial No. 45,294. 4 Claims. (Cl. 88—14). Apparatus for determining the opacity of paper and the like, comprising a light source, a pair of photovoltaic cells positioned to receive light from said source, electrically operable indicating means, circuits connecting said indicating means and said cells in a manner to oppose the cell currents produced by the action of light from said source to register in said indicating means differences in the strengths of the opposed currents, a light intersepting member disposed, between said light source and one of said cells and having an aperture therein, a rotary carrier behind said member, one of said cells being mounted eccentrically on said carrier behind said member, means for rotating said carrier to move the cell thereon periodically across the aperture at a predetermined speed, and a cover adjustable over said aperture to vary the effective area thereof.

Process of Producing Pigmented Paper and Impregnating It with a Resinous Binder and the Product

Patent No. 2,125,076. Gerald H. Mains, Murrysville, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania. Application December 12, 1933, Serial No. 702,022. 9 Claims. (Cl. 154—2). A molded laminated product comprising a plurality of sheets of paper impregnated with a resinous binder suitable for molding, a sheet of paper having a pigment dispersed throughout the body thereof and impregnated with a resinous binder superimposed on the other sheets, all of the sheets being molded into a unitary structure.

Sharpening Tool for Paper Drills

Patent No. 2,125,566. Harry S. Hill, Portland, Ore., assignor to Harry Hill Manufacturing Co., Portland, Ore. Application March 2, 1936, Serial No. 66,693. 2 Claims. (Cl. 76—82). A sharpening tool for paper drills comprising a hollow cylindrical body member whose inside diameter is equal to the outside diameter of the head of a paper drill, a sharpening element mounted on the interior of the body member at one of its ends, rotatable means disposed at the opposite end of the body member and adapted to impart rotary motion to a paper drill disposed within the body member.

Sensitized Blue Print Paper and Coating Therefor

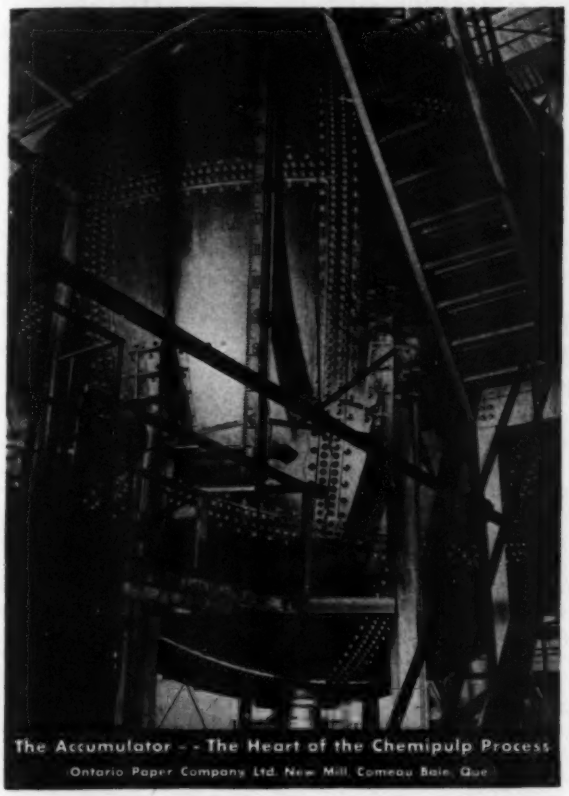
Patent No. 2,126,504. Alger P. Reynolds, North Beverly, Mass., assignor to Spaulding-Moss Company, Boston, Mass., a corporation of Massachusetts. Application August 21, 1937, Serial No. 160,309. 1 Claim. (Cl. 95—7). A sensitized blue print paper coating containing an acid hydrolyzable alkali metal phosphate, a light-sensitive iron salt in the ferric state and an alkali metal ferrocyanide, the proportions of said alkali metal phosphate to the other ingredients of the coating being such that a water solution of said coating has a pH value of less than 7 but not sufficiently low to permit the formation of an insoluble blue compound prior to exposure to light.

Laminated Paper

Patent No. 2,123,760. Van Hamm Wilshire, Dayton, Ohio, assignor to The Specialty Papers Company, Dayton, Ohio, a corporation of Ohio. Application June 16, 1934, Serial No. 730,851. 8 Claims. (Cl. 154—50). A waterproof and greaseproof laminated pliable paper material which can be readily folded and especially adapted for container use for preserving the flavor of edible food products containing volatile oils, comprising a sheet of glassine paper and a thicker sheet of smooth finish wax absorbent paper of a weight of the order of 50 pounds or less per ream of 24"x36" per sheet held to the glassine sheet merely by an intermediate layer of wax which is also absorbed for some distance into the wax absorbent paper, the laminated material having a surface coating of wax applied directly to the glassine sheet.

Paper Manufacture

Patent No. 2,121,540. Leonard R. Growdon, Chillicothe, Ohio, assignor, by mesne assignments, to K. C. M. Company, Dayton, Ohio, a corporation of Delaware. Application May 1, 1934, Serial No. 723,362. 10 Claims. (Cl. 92—40). The method in the formation of a sheet of paper which comprises forming a wet web of paper, adding additional paper forming material including mineral filler to the lower side of the wet web to incorporate said material into and upon said lower side, turning the sheet over, and then applying suction to the lower side of the sheet to obtain a uniform distribution of the additional paper forming material in the web.



The Accumulator - - The Heart of the Chemipulp Process

Ontario Paper Company Ltd. New Mill, Comeau Baie, Que

53 installations of the Chemipulp System are tangible evidence of acceptance by the manufacturers of sulphite pulp on the North American Continent. 11 different companies have placed 16 repeat orders for the System. An illustrated and descriptive folder may be had upon request.

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DOMESTIC—TALC AND WHITING

PULP
BLEACHING
COMPANY

ORANGE
NEW JERSEY

CELLULOSE
PURIFICATION

▸▸▸ IMPORTS OF PAPER MILL MACHINERY by British India totaled Rs. 2,969,000 (rupee equal to about $0.375 in 1936 and $0.373 in 1937) during 1937 as compared to Rs. 655,000 in the preceding year. The demand for this equipment was created by the organization of a few paper mills in the country during the year. It is believed that the bulk of the paper machinery was supplied by European manufacturers.

◆

WATERVLIET CO. EMPLOYEES HAVE THEIR OWN "FAIR"

When it came time to stage its annual employee outing this year, the Watervliet Paper Company, Watervliet, Michigan, cast about for an interesting feature to add to the usual schedule of sports and games. A "leisure-time fair" was the result.

Housed in a huge tent, the "employee fair" was one outing feature which no one overlooked, for within the canvas walls was an edifying display of employee handicraft, agriculture, needlework, canning and preserving and hobbies. It disclosed the men and women who work in the Watervliet mill as avid and expert farmers, craftsmen and home economists. Awards were made to the best exhibits.

At the formal program, plaques were presented to three directors of the Watervliet Paper Company who were instrumental in organizing the concern 28 years ago. These were: James B. Balch, Charles B. Hays and August B. Scheid, all of Kalamazoo.

◆

FATHER, 2 SONS CONTROL BOX CO.

That turnabout is not only fair play but that it also can be successful play was revealed recently by an interesting account of a New Brunswick company controlled by a father and two sons which recently turned to the manufacture of corrugated paper boxes after forty years in the wooden box field.

Three years ago, as an experimental line, Wilson Boxes, Ltd., Fairville, New Brunswick, then known by the original name of the Wilson Box and Lumber Company, added the manufacture of corrugated paper boxes to its line of wooden boxes and shooks. In February, 1938, the plant was destroyed by fire and practically all the machinery was ruined.

Pending the start on a new plant, Fred L. Roderick, who with his two

Improved Pulp Mill Systems and Specialties

Complete circulating systems for sulphite and sulphate digesters, with or without automatic control, for increasing yield and improving quality of pulp and saving of steam.

Improved chip distributors, for greater and more uniform loading of digesters.

Additions to sulphite acid plants, for obtaining a higher strength of free SO_2 together with more accurate control of the combined SO_2 than has been heretofore obtainable, especially where cold cooling water is not available.

Improved systems for complete and independent reclamation of SO_2 gases from digester relief gas, and for simultaneously building up the SO_2 in finished acid to previously unobtainable strengths, without interference with raw acid production.

The spray sulphur burner and furnace that has been adopted for over thirty installations since its introduction in 1927.

Sulphide ore roasters for production of high strength gas.

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Consulting, Contracting and Erecting Chemical Engineers

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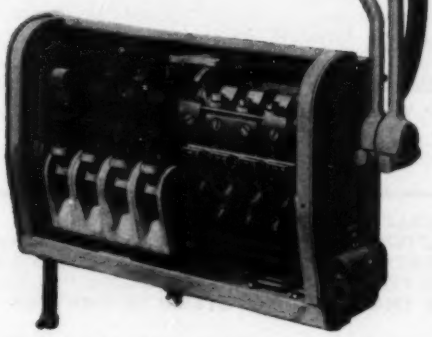
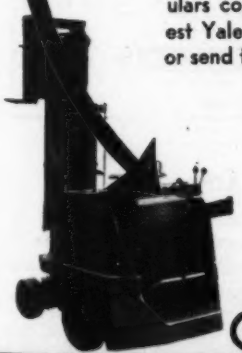


THE CAM-O-TACTOR

Once again Yale paces the field with a brand new Electric Truck engineering advance—Cam-O-Tactor Control.

Entirely different—this new type controller combines the high current interrupting capacities and long life of contactors with the positive action and safety of mechanical cam-operation. In addition it accomplishes the make and break contacts without creating the usual sticking or welding of electrical surfaces . . . EVEN WHEN UNDER EXTREME VIBRATION OR FLUCTUATION OF VOLTAGE!

And don't forget—ONLY Yale trucks can bring you these outstanding improvements because ONLY Yale trucks feature Cam-O-Tactor Controll For further particulars contact the nearest Yale representative or send for Free Folder.



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PHILADELPHIA DIVISION

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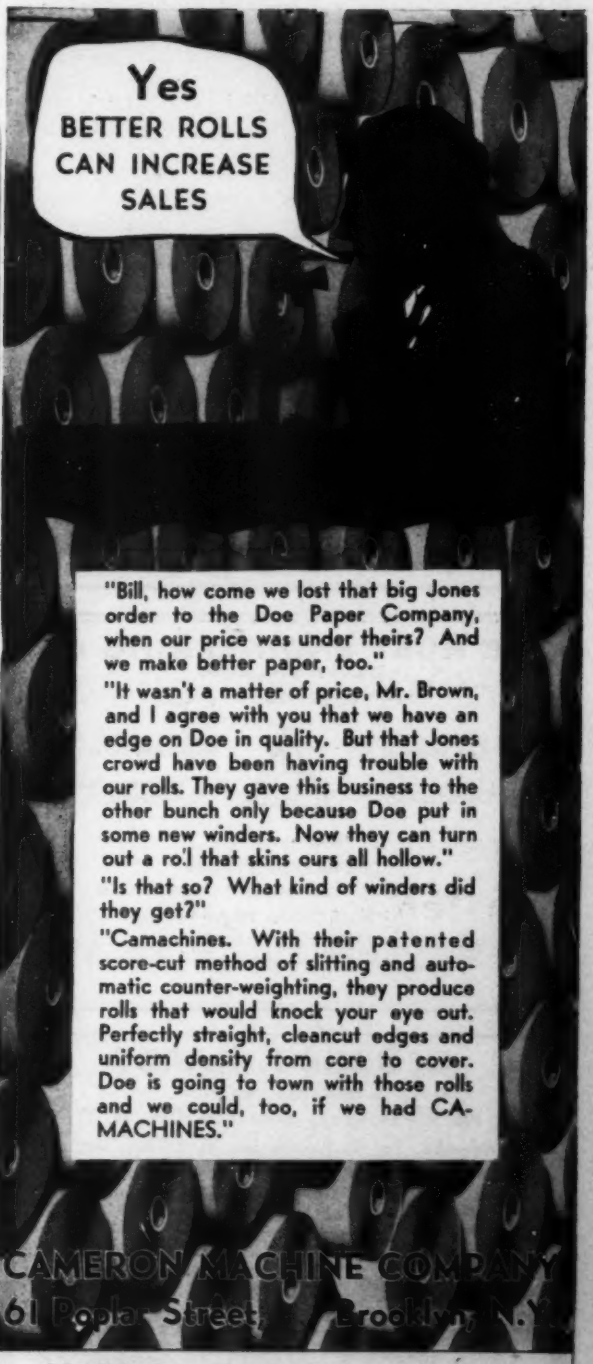
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"Bill, how come we lost that big Jones order to the Doe Paper Company, when our price was under theirs? And we make better paper, too."
"It wasn't a matter of price, Mr. Brown, and I agree with you that we have an edge on Doe in quality. But that Jones crowd have been having trouble with our rolls. They gave this business to the other bunch only because Doe put in some new winders. Now they can turn out a roll that skins ours all hollow."
"Is that so? What kind of winders did they get?"
"Camachines. With their patented score-cut method of slitting and automatic counter-weighting, they produce rolls that would knock your eye out. Perfectly straight, cleancut edges and uniform density from core to cover. Doe is going to town with those rolls and we could, too, if we had CAMACHINES."
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sons, Fred J., and Frank G., form the executive staff of the business, acquired space in an abandoned cotton mill in St. John, N. B., of which Fairville is the immediate suburb. This temporary location was utilized until a new plant was completed in mid-July on the original location. With the resumption of production in late July concentration was made on the production of paper boxes. Thus, the firm which had produced only wooden boxes and shooks for about four decades, was now producing only paper boxes.

Mr. Roderick, Sr., acquired the Wilson firm in 1925. He is president of the company while Fred J. Roderick, one of his sons, is vice-president, and Frank G. Roderick, another son, is mechanical manager. The assembling and installation of the machinery was under the joint direction of F. L. Roderick and Frank G. Roderick. Knowing nothing at all about paper box making three years ago, both have familiarized themselves with the mechanics of the industry.

When Mr. Roderick took over the Wilson concern 13 years ago the business was disorganized and in bankruptcy. From the doldrums and evident eclipse, the Wilson Box and Lumber Company became one of the busiest manufacturing in the St. John district and now the sales scope has been broadened to include all of the islands of Bermuda and the British West Indies, in addition to Newfoundland.

♦

▸▸▸ AN ARGENTINE PAPER COMPANY, Cellulosa Argentina, manufacturers of pulp from wheat straw, has recently begun the production of mechanical wood pulp. The plant, located in Zarate, near the delta of the Rio de la Plata, utilizes for the most part the wood of the poplar, willow and weeping willow trees. The capacity is 12 metric tons of pulp per day (metric ton equal to 2,204.6 pounds).

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STICKLE AUTOMATIC STEAM CONTROLS
DRAINAGE SYSTEMS FOR DRYERS AND HEATING SYSTEMS
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Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment.
Complete power plants to meet any operating conditions of Pulp and Paper mills or other Industrial service. Engineering and Construction.
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PURE THREE POINT LUBRICATION
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A COMPLETE LINE OF INDUSTRIAL PETROLEUM PRODUCTS
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Annual Roll Call

November 11-24, 1938

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MICRO GROUND

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Facts About Accidents in the Paper & Pulp Industry

Interesting and Valuable!

What were the outstanding facts about accidents in the Paper & Pulp Industry during 1937? How did they compare with other industries? How did your plant's record compare with others?

These and many other revealing and important data are presented in detail in "1937 Accident Rates In the Paper & Pulp Industry", recently published by the National Safety Council. We'll be glad to send a copy FREE to any Safety Director or other plant executive upon request. Simply drop us a line on company letterhead.

Contents . .

Outstanding Facts
Comparison with other Industries
Experience by Type of Industry
Experience in various types of Mills
Experience in various Departments
Causes of Serious Accidents
Disabling Injuries by Industrial Groups
Types of Accidents
Best All-Time Records
Individual Plant Records

PAPER & PULP SECTION NATIONAL SAFETY COUNCIL TWENTY NORTH WACKER DRIVE CHICAGO ILL.

PERSONALS

NEW APPOINTMENTS AT M. AND O. CO.

Formerly general superintendent of the Minnesota and Ontario Paper Company, Clarence Larson was recently appointed to the position of resident manager of the M. and O. organization at International Falls, Minn., and resident vice-president of the various subsidiaries in the Falls-Fort Frances area. Mr. Larson's new duties were effective October 1. He succeeds Frank A. Morris, who resigned recently.

Starting some 24 years ago, Mr. Larson has gone through all the stages in the manufacture of paper and Insulite. He began work as an assistant in the chemical laboratory.

Other changes in the executive personnel of the M. and O. staff, as announced by R. H. M. Robinson, business manager, include the appointment of M. S. Wunderlich, former chief research engineer, to the position of assistant manager and vice-president of the Insulite Company; E. L. McCormick to the position of general superintendent of the paper and pulp operations (cf. THE PAPER INDUSTRY and PAPER WORLD, p. 698, Sept., 1938); and the naming of Dr. John O. Burton to assume the position of Chief Research engineer, the former position of Mr. Wunderlich. Mr. Wunderlich has been in research work for the past nineteen years and his duties have taken him abroad where he made an exhaustive study of Insulite and insulation materials. Mr. McCormick came to the northwest from St. Regis Paper Company. He has spent the greater part of his life in the pulp and paper industry.

◆

NEW APPOINTMENTS AT SAVANNAH LAB.

Dr. Charles H. Carpenter, acting director, has been made technical director and Frank Heyward, Jr., has been made acting field director, for the Herty Foundation Laboratory at Savannah, Georgia. These selections were made at a meeting of the board of directors of the Foundation held in Atlanta, September 24.

Elliott W. Reed, a member of the board and a close personal friend and advisor of the late Dr. Charles H. Herty, was elected chairman of the executive committee. Mr. Reed's home is in Savannah, and since the inception of the laboratory a number of years ago, he has devoted a great deal of his time to its promotion.

Dr. Carpenter has been connected with the laboratory for a number of years, having been made chief chemist by Dr. Herty some months before the eminent scientist's death. Mr. Heyward is State Forester for Georgia and was loaned to the laboratory for an indefinite period by Governor E. D. Rivers.

At the board meeting a plan was initiated whereby fellowships providing for study at the Herty laboratory would be authorized under certain conditions to be worked out at a later date.

Left to right: Elliott W. Reed, chairman of the executive committee of the Herty Foundation Laboratory; Dr. Charles H. Carpenter, technical director, and Frank deC. Heyward, Jr., acting field director.

Clarence Larson — M. S. Wunderlich

▸▸▸ Actively identified in the pulp and paper industry for more than twenty years, *William H. Kenety*, vice-president of the Northwest Paper Company, Cloquet, Minn., was recently appointed managing director of the Book Paper Manufacturers Association at a meeting held in Chicago, September 27. Mr. Kenety was formerly connected with the Weyerhaeuser Lumber Companies. He was made general manager of the Northwest Paper Company in 1930.

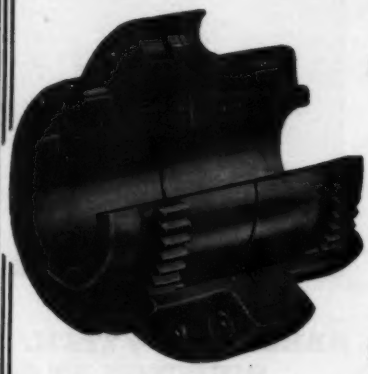
◆

BAKER HEADS MILL DIVISION H. K. FERGUSON CO.

Harold T. Baker, paper mill engineer, has joined The H. K. Ferguson Company to take charge of the Paper

POOLE

FLEXIBLE COUPLINGS



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HIGH POROSITY

. . as a characteristic of a paper maker's felt will, not only add to the life of felt, but saves time lost on the machine due to excessive shut downs for washing. Specify

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and minimize this trouble. Made by the Knox Woolen Co., of Camden, Maine, since 1864.

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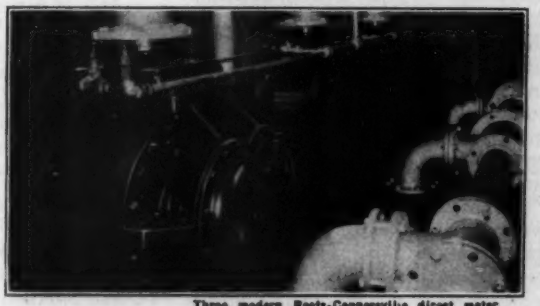
in a VACUUM PUMP demand ECONOMY



Three modern Roots-Connersville direct motor driven pumps installed in a southern paper mill.

(1) Power required per ton of paper (2) yearly operating cost of the vacuum pumps (3) and cost of maintenance—on all three points Roots-Connersville Pumps show a saving. Important, too, is their smooth, dependable performance that helps keep paper machines running with maximum efficiency. May we tell you more of this modern equipment.

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PITTSBURGH • BOSTON • DETROIT • ST. LOUIS • LOS ANGELES

Harold T. Baker

Mill Engineering Division, with headquarters in Cleveland. Mr. Baker will bring to the Ferguson organization a knowledge of paper mill requirements which will enable that company to give the same complete service to the paper trade which it is giving to many other industries, of designing, building, and completely equipping pulp and paper mills, ready for operation, including power plants, and making investigations for improvements and additions.

Mr. Baker's experience in the industry includes actual and consulting engineering and plant layout for practically all grades of paper manufacture, with necessary power units, as well as the manufacture of paper machines and other equipment. He is well qualified to direct the activities in the paper field, which is one of increasing importance among the several industries in which the H. K. Ferguson Company specializes as engineers and builders.

Mr. Baker's most recent connection was as chief engineer for The Bagley & Sewall Company, Watertown, N. Y., manufacturers of paper machines. He is a graduate of Dartmouth College and Thayer School of Civil Engineering. He is a member of the Technical Association of Pulp and Paper Industry.

◆

MORTENSON TO ASSIST MAYO AT UNION BAG

Alfred O. Mortenson, electrical engineer and assistant superintendent of power at the Savannah plant of the Union Bag and Paper Corporation, has recently been appointed assistant to Ed. Mayo, well-known pulp and paper authority. Mr. Mayo has been with the Union Bag and Paper Corporation for the past two years as production manager.

Mr. Mortenson has spent twenty-seven years in the pulp and paper industry. His most recent former connections were with the St. Regis Paper Company, the Gilman Paper Company and the Brown Company. He served these firms in various capacities ranging from electrical construction foreman to plant engineer. In his early days Mr. Mortenson was with the International Paper Company, the Wayagamack Pulp and Paper Company, the Great Northern Paper Company and others, as a papermaker. His early training took him into all departments connected with the plants in which he worked and now assists materially in fitting him for his new position.

◆

A. O. Mortenson

BARBER NOW TECH. DIRECTOR AT C-Z

Appointment of William R. Barber, technical supervisor of the Camas (Wash.) mill of the Crown Willamette Paper Company, as technical director of the Crown Zellerbach Corporation, was announced recently by A. Bankus, vice-president. The appointment, which took effect last month, fills the vacancy caused by the resignation of E. C. Lathrop last year. Mr. Lathrop has become vice-president of the Celotex Corporation in Chicago.

Mr. Barber has been in charge of the Camas laboratory since 1934. His new duties place him in charge of technical control in all Crown Zellerbach mills. He will continue to make his headquarters in the Camas mill, which is a member of the Crown Zellerbach group.

Dr. Owen Smith

DR. SMITH NOW PRESIDENT OF GROVETON PAPER

Dr. Owen Smith, president and a director of the Odell Manufacturing Company, is now president of the Groveton Paper Company, Inc., Groveton, New Hampshire, it was revealed recently.

Dr. Smith was formerly a director of the Poland Paper Company and a director and treasurer of the Poland Manufacturing Company. He is, at present, president of the Maine State Chamber of Commerce and chairman of the National Advisory Committee for the State of Maine of the New York World's Fair. Dr. Smith maintains offices in Portland, Maine.

W. R. Barber

"NON-USERS ARE THE LOSERS"

TENAX FELTS

FINISH AND TRIM

LOOK BACK, — THEN AHEAD!

During the past 47 years, since TENAX FELTS were introduced in 1891, there have been "boom" years and "lean" years. Through all of which, TENAX FELTS have continuously kept abreast of conditions, and pointed the way of progress in paper making.

1938 again finds TENAX FELTS in the forefront of the battle for Low Operating and Manufacturing Costs; for Better Finish with Savings in Finishing Costs. Specify TENAX FELTS on your next order.

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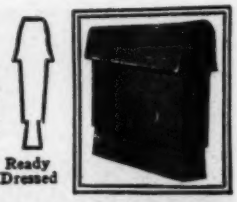
LABOR SAVING—TIME SAVING

THE MOST ECONOMICAL FILLING THAT CAN BE PUT IN A MORTISE WHEEL



Ready Dressed

Blank Head

WE MAKE ANY STYLE OR SIZE WANTED

WRITE FOR INSTRUCTION SHEET "O" WHICH IS FREE

QUICK SERVICE ON ALL SIZES

THE N. P. BOWSHER CO., South Bend, Ind.

Pulp and Paper Mill Screens

of STAINLESS STEEL—COPPER—BRONZE—MONEL—CHEMICAL RESISTING ALLOYS

Perforations that are accurate in size and alignment
ANY METAL »« ANY PERFORATION

The Harrington & King PERFORATING CO.

5654 Fillmore St., Chicago, Ill., ◆114 Liberty St., New York, N.Y.

729,290 Tons Annually (2,330 Tons Daily) of Southern Kraft Pulp

Screened clean by 22 APMEW knotters (Each 105 tons daily driven by ONE H.P. Motor) and 28 APMEW Screens (First Screens each handling 105 tons daily using 35 H.P.) in new Kraft Mills of the South.

CLEAN PULP IS BEING PRODUCED—WITH GREAT EFFICIENCY by Centrifugal Separation Principle and Inward Flow Screening.

TEN CENTS per ton pays for these 22 APMEW Knotters and 28 APMEW Screens in one year. SAVINGS in power, labor, maintenance, repairs, etc.; usually repay the investment in less than one year, and thereafter makes good earnings.

AMERICAN PAPER MACHINERY & ENGINEERING WORKS, Inc.

GLENS FALLS, NEW YORK

NECROLOGY

THOMAS A. WELDON

Thomas A. Weldon, a leading paper manufacturing executive, vice-president of Provincial Paper, Ltd., and a director of Interlake Tissue Mills Company, passed away September 3 at the age of 78.

For over a quarter of a century Mr. Weldon was manager of the E. B. Eddy Company, Hull, Quebec. Subsequently, in association with his brother, the late Isaac H. Weldon and a group of Kalamazoo (Mich.) paper men, he took over the Montrose Paper Mills at Thorold, Ontario, of which Mr. Weldon became president. When the Provincial Paper Company was organized it took over the Montrose mill, together with others, and Mr. Weldon became associated with the new firm. Mr. Weldon is survived by a daughter, a brother and three sisters.

◆

HERBERT LIPPITT

Herbert Lippitt, manager of the Cap and Core Department of the International Paper Company, passed away September 24 at the age of 48.

Mr. Lippitt was born in Russia in 1890 and came to this country in 1909. From 1909 to 1914 he was a salesman

Herbert Lippitt

for a firm of wholesale grocers in Boston, leaving to go with the Brown Company in Berlin, N. H. In 1920 Mr. Lippitt joined International where his duties included acting as a special representative in reciprocal matters and in the company's foreign affairs. During his connection with the International Paper Company, he traveled extensively in this country and abroad. At the time of his death, Mr. Lippitt was manager of sales for caps, cores, mill wrappers and bindarene.

Surviving Mr. Lippitt are two sisters and four brothers. Funeral services were held in New York September 28.

◆

▸▸▸ *Albert Butterfield,* retired superintendent of the Advance Bag Company, Middletown, Ohio, passed away at his home September 26. Mr. Butterfield was 55 years old. He had been employed by the Advance Bag Company for 35 years.

◆

CARL J. PFEIFER

Carl J. Pfeifer, treasurer of the Chain Belt Company, Milwaukee, passed away recently in Philadelphia at the age of 58.

Mr. Pfeifer entered the employ of the Chain Belt Company in 1914 as comptroller after leaving the employ of Arthur Young and Company. In 1916 he was elected treasurer of the firm, a position he held until his recent death.

Mr. Pfeifer was at one time director of the National Association of Cost Accountants and the Controllers Institute of America, in which organizations he was very active. For many years Mr. Pfeifer was connected with the Milwaukee Goodwill Industries and was very active in other charitable work throughout Milwaukee.

Surviving Mr. Pfeifer are his widow, two sons and a daughter. One son, G. Herbert Pfeifer, is associated with the Chain Belt Company.

◆

▸▸▸ *Mrs. Elva A. Lennox,* wife of Robert W. Lennox, treasurer of Hollingsworth and Vose Company, East Walpole, Mass, was one of the hundreds of victims of the recent hurricane which struck New England. Mrs. Lennox and a companion were caught by the hurricane at her summer home at Wareham.

◆

▸▸▸ *George F. Larcom,* for forty years associated with the Hollingsworth and Whitney Company in the Boston office, passed away September 4 at his home in West Newton, Mass. For many years he had been director of purchases for the paper firm, and as such enjoyed unusually wide friendship in the supply trades. He is survived by his son and three daughters.

◆

CARL ANDERSON

Widely known in art and printing circles, Carl J. H. Anderson, for several years art director in charge of design and printing of Hercules Powder Company advertising, passed away suddenly in Wilmington, Del., September 17. He was 52 years old.

Mr. Anderson was born in Plankinton, South Dakota, where he received his early schooling. Evincing an early inclination toward the printing arts, he began his career via the print shop route. Although he was successful as a printing plant manager, he preferred to specialize in layout and design. In that capacity he served with the Eddy Press Corporation of Pittsburgh and with the Franklin Printing Company in Philadelphia. At the latter place, an important contribution to the printing arts was his work on *The Franklin Crier.*

In 1935 Mr. Anderson joined the Advertising Department of the Hercules Powder Company as art director and director of the company's printing plant. Of notable success, his editorship of Hercules' *Paper Maker* was typical of the fine literary touch which rounded out his creations with paper, ink, illustrations and type.

Carl J. H. Anderson

Mr. Anderson is survived by his widow, two sons, four brothers and two sisters. His elder son, James L. Anderson, will carry on with some of his work at the Hercules Powder Company.

THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

Made by

DRAPER BROTHERS COMPANY

CANTON, MASS.

Woolen Manufacturers Since 1856

REPRESENTATIVES

L. H. BREYFOGLE, Kalamazoo, Mich. **C. K. BEECHER, Delaware, Ohio**

---

27 years of satisfactory service

Chicago's Largest and Most Complete Stock ELECTRIC POWER EQUIPMENT

Save 50% or more on Guaranteed Rebuilt Equipment

MOTORS — Synchronous, Slip-Ring, DC Variable Speed, Etc.

Frequency Changers Engine Gen. Sets Steam Turb. Gen. Sets Generators Pumps Compressors

CHICAGO ELECTRIC COMPANY

1324 W. 22nd St. *Write for Catalog* **Chicago, Ill.**

J. W. HEWITT MACHINE CO., Inc.

Neenah, Wisconsin

Builders of

Paper Making Rolls and Special Machinery

Roll Grinding a Specialty

For Sale — Paper Machinery

Paper Machines: 72 in., 126 in.

Experimental Fourdrinier Paper Machine with wire 46 in. by 50 ft., 2 presses, Minton vacuum dryer, worm gear drive.

Calender Stacks: 116 in., 114 in., 104 in., 100 in., 90 in., 88 in., 84 in., 76 in.

Super Calenders: 44 in., 72 in., motor driven.

Sheet Cutters: 72 in., 94 in., 108 in., 136 in., duplex with or without layboys: single: 44 in. to 100 in. (20 cutters and layboys).

Slitters: 60 in. Cameron. 60 in. Kidder.

Trimmers: 2-50 in. Seybold.

Dryers: Several hundred, from 42 in. to 100 in. face.

Fourdrinier Part: Late type, Moore & White, takes wire 80 in. by 50 ft., with Voith inlet and suction couch.

Jordans: 3 Jones, 2 Emersons, 2 Appleton.

BEATERS — PUMPS — ROLLS — REEVES DRIVES

Write to us when you want to sell Paper Mill Machinery

FRANK H. DAVIS CO.

175 Richdale Avenue, Cambridge, Massachusetts

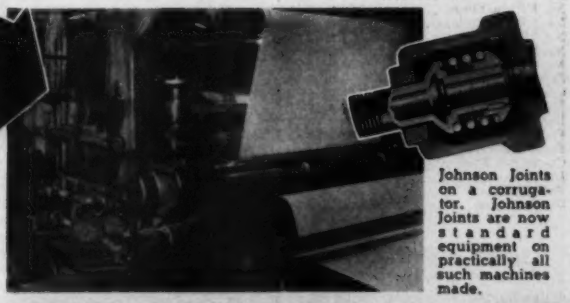
You are paying for this advanced "steam fit" — *why not* HAVE *it!*

YOU are paying in wasted time — time spent in repacking, adjusting and oiling. And you are paying in wasted power and rapid deterioration of your old-time steam fits.

Johnson Rotary Pressure Joints have no packing of any kind. The two special carbon graphite rings which form the bearings and pressure seal are *self-lubricating*. Sealed by the pressure, they are also *self-adjusting*. Equally important is the ball-and-socket design which compensates for angular misalignment and the annual space between the outlet and the housing which provides for lateral misalignment. These features combine to give the Johnson Joint many times the service life of former types.

There is a Johnson Joint for every type of machine with every kind of cylinder drainage.

Ask for complete description of this equipment.



Johnson Joints on a corrugator. Johnson Joints are now standard equipment on practically all such machines made.

THE JOHNSON CORPORATION

845 WOOD STREET **THREE RIVERS, MICH.**

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS — *per cwt.*

Blue Overalls	4.75 to 5.00
Corduroy	2.25 to 2.50
Cottons—	
Washables, No. 1	1.65 to 1.80
Fancy Percales	3.00 to 3.25
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.60 to 1.75
New Dark Seconds	1.50 to 1.60
Khaki Cuttings—	
Mixed	3.25 to 3.50
O. D.	3.75 to 4.00
New Canvas	7.00 to 7.50
New Mixed Blacks	2.50 to 2.75
Shirt Cuttings—	
New White No. 1	6.75 to 7.00
Silesias No. 1	4.00 to 4.25
New Unbleached	6.75 to 7.00
Fancy	3.25 to 3.50

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	1.05 to 1.10
No. 2	.85 to .90
No. 3	.75 to .80
Twos and Blues—	
Repacked	1.50 to 1.60
Thirds and Blues—	
Repacked	1.30 to 1.40
Miscellaneous	1.05 to 1.15
White, No. 1—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00
White, No. 2—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00

RAGS (Foreign)
ex dock New York City

NEW RAGS — *per cwt.*

New Dark Cuttings	2.25 to 2.50
New Mixed Cuttings	2.00 to 2.25
New Light Silesias	4.25 to 4.50
Light Flannelettes	4.50 to 4.75
Unbleached Cuttings	6.75 to 7.00
New White Cuttings	7.00 to 7.25
New Light Oxfords	3.75 to 4.00
New Light Prints	3.25 to 3.50

RAGS (Foreign)
ex dock New York City

OLD RAGS — *per cwt.*

No. 1 White Linens	7.00 to 7.25
No. 2 White Linens	6.00 to 6.25
No. 3 White Linens	4.75 to 5.00
No. 4 White Linens	3.50 to 3.75
No. 1 White Cottons	4.00 to 4.25
No. 2 White Cottons	3.25 to 3.50
No. 3 White Cottons	2.50 to 2.75
No. 4 White Cottons	2.00 to 2.25
Extra Light Prints	2.50 to 2.75
Ord. Light Prints	2.00 to 2.25
Med. Light Prints	1.90 to 2.10
Dutch Blue Cottons	2.00 to 2.25
French Blue Cottons	2.25 to 2.50
French Blue Linens	2.75 to 3.00
Checks and Blues	1.75 to 2.00
Linsey Garments	1.50 to 1.60
Dark Cottons	1.15 to 1.25
Old Shapperies	1.00 to 1.10

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	2.25 to 2.35
Domestic	2.10 to 2.20
Wool Tares—	
Light	1.80 to 1.90
Heavy	2.00 to 2.10
Bright Bagging	1.60 to 1.70
Manila Rope—	
Foreign	2.75 to 3.00
Domestic	3.00 to 3.25
New Burlap Cuttings	2.25 to 2.40
Jute Threads—	
Foreign	2.75 to 3.00
Domestic	3.00 to 3.25
Strings—	
Sisal	1.50 to 1.60
Soft jute	1.75 to 1.85
Mixed	.80 to .90

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	2.40 to 2.50
Ord. Hard White No. 1	1.75 to 2.00
Ord. Soft White No. 1	1.60 to 1.75
Flat Stock—	
Stitchless	.75 to .80
Overissue Mags	.65 to .70
Solid Flat Book	.55 to .60
Crumpled No. 1	.50 to .55
Solid Ledger Books	1.40 to 1.50
Ledger Stock—	
White	1.15 to 1.25
Colored	.70 to .80
New B. B. Chips	.20 to .22½
Manilas—	
New Env. Cuts	1.50 to 1.60
New Cuttings	1.30 to 1.40
Bogus Wrappers	.20 to .22½
No. 1 Old Kraft	.60 to .75
News—	
No. 1 Wh. News Cuttings	1.35 to 1.45
Strictly Overissue	.40 to .45
Strictly Folded	.30 to .35
No. 1 Mixed Paper	.12½ to .17½

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt	3.40 -
Ground, cwt	3.15 -
Powdered, cwt	3.55 -
Blanc Fixe—	
Bulk, ton	42.50 to 45.00
Barrels, pound	.0350 to .0375
Bleaching Powder—	
Drums, cwt	2.00 to 2.25
Casein (Domestic Standard)—	
Ground (bags), lb	9.00 to 9.50
Fine grd. (bags), lb	9.50 to 10.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	6.50 to 12.00
Domestic Coating	
Bulk (mine) ton	11.00 to 20.00
Imported (ship side)	
Bulk (lump) ton	14.50 to 24.00
Chlorine—	
Tank cars (wks) cwt	2.15 to 2.55
Gelatine (silicin) lb	.42 to .44
Glyc. (C.P.) drums, lb	.1425 to .1475
Litharge, bbl., lb	.07 to .0725
Rosin (Gum)—	
New York, 280 lb. barrel	
E, per bbl	5.90
F, per bbl	5.95
G, per bbl	6.10
WW, per bbl	7.50
Rosin (Wood), per bbl., carlots	5.25
Salt Cake—	
Dom. bulk (wks) ton	12.00 to 13.50
Imp. bulk on dock—	
(Atl. ports) ton	14.50 to 15.00
Soda Ash—	
Bulk (works) cwt	.90 to .95
Paper Bags, cwt	1.05 to 1.30
Barrels, cwt	1.05 to 1.30
Soda (Caustic)—	
Solid, drums, cwt	2.30 to 2.40
Ground and flake, drums, cwt	2.70 to 2.80
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt	1.85 to 2.00
40 deg., 35 gal. drums, (works) cwt	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt	2.45 -
Pearl, barrels, cwt	2.70 -
Paper (Sp.) bags, cwt	2.55 -
barrels, cwt	2.80 -
Sulphur (crude)—	
(mine) bulk, ton	18.00 to 21.00
Talc—	
Dom. 100 lb. bags (mine) ton	14.00 to 18.00
Imp. bulk, ton	25.00 to 40.00
Titanium Dioxide—	
Ba. Pig., bbls., lb	.05¾ to .06½
Ca. Pig., bbls., lb	.05¾ to .06½
Zinc Sulphide, bbls., lb	.09 to .095

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached	2.55 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	2.75 to 3.00
Kraft No. 1	2.00 to 2.25
Kraft, Southern, del	1.75 to 2.00
Sulphate (Imp.) on dock—	
Bleached	2.75 to 3.00
Kraft No. 1	1.65 to 1.85
Kraft No. 2	1.55 to 1.65
Sulphite (Dom. & For.) On dock—	
Prime bleached	2.50 to 2.75
Prime easy bleach	2.25 to 2.50
Prime strong unbl	1.90 to 2.15

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. mill)	19.00 to 22.00
No. 1 Imp. (On dock)—	
Moist	35.00 to 36.00
Dry	34.00 to 35.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	71.00 to 77.00
Chip	27.50 to 30.00
Chip, agl. mla. lined	42.50 to 45.00
Coated, white patent .016	60.00 to 65.00
.020 and heavier	55.00 to 60.00
Kraft liner	42.50 to 45.00
News	27.50 to 30.00

	per cwt.
Book (cased)—	
No. 1 Glossy Coat	10.50 to 12.25
No. 2 Glossy Coat	9.25 to 10.50
No. 3 Glossy Coat	8.15 to 9.25
No. 4 Glossy Coat	7.65 to 8.75
No. 1 Antique	7.65 to 8.75
No. 2 Offset	7.00 to 8.00
A Grade E. F.	6.80 to 7.75
A Grade Super	7.05 to 8.00
B Grade E. F.	6.25 to 7.25
B Grade Super	6.50 to 7.50
C Grade E. F.	6.00 to 7.00
C Grade Super	6.25 to 7.25
D Grade E. F.	5.70 to 6.75
D Grade Super	5.95 to 7.00
Ivory & India	.50 cwt. extra

	per cwt.
Bonds (Rag Content)—	
100% Rag	
Ext. No. 1	39.10 to 46.00
100% Rag	31.05 to 36.50
85% Rag	
75% Rag	23.60 to 27.75
65% Rag	20.50 to 25.00
50% Rag	17.55 to 21.50
25% Rag	14.65 to 17.75
Regular Colors	1.00 cwt. extra
Heavy Colors	3.00 cwt. extra

	per cwt.
Bonds (Sulphite)—	
No. 1	8.80 to 10.75
No. 2	7.90 to 9.50
No. 4	7.00 to 8.50
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	12.25 -
Bleached (25 lb. up)	11.25 -
Unbleach (25 lb. up)	9.50 -
Greaseproof—	
Bleach. (25 lb. up)	9.20 -
Unbleach. (25 lb. up)	8.75 -

	per cwt.
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Heavy Colors	3.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	9.95 to 12.00
No. 2	9.05 to 11.00
No. 4	8.20 to 10.00

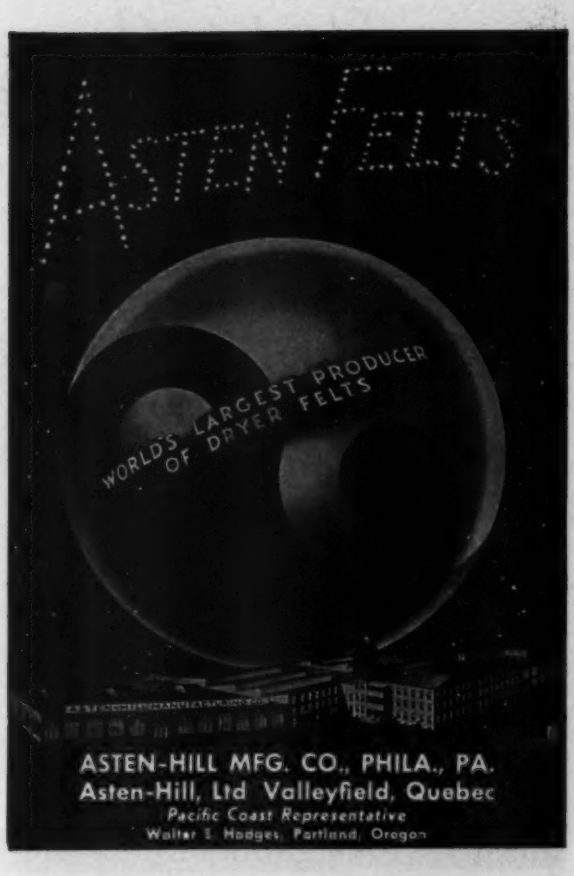
	per ton
News—	
Rolls (Contract)	50.00 -
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
Anti-Tarnish M. G	.75 -
Colored	.875 -
Kraft	.75 -
Manila	.60 -
Napkins, semi-crepe (12¼ lb. to M shts.) per cs.	.48 -
Napkins, full crepe and emb'sed (12¼ lb. to M shts.) per cs.	.52 -
Toilet, Bleached (M shts.) per cs	5.80 -
Toilet, Unbleached (M shts.) per cs	3.20 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.90 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	4.75 to 5.25
Super-Standard	4.12½ to 4.62½
Northern Standard	4.00 -
Southern Standard	3.50 -
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	5.75 -
(10,000 lbs.)	6.00 -
Drug wrapp. 25 lb.	6.00 -
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.25 -
No. 1 Butchers	4.50 -
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.875 -
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.625 -
Steam Finish, 50 lb.	3.875 -
Water Finish, 40 lb.	4.25 -
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	4.75 -
Envp. Mla., Sub. 16-28 (No. 2)	4.50 -
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 25 lb. up—	
No. 1	5.00 -
No. 2	4.75 -
M. G. Sulphite (other than Waxing)	
Grade A-25 lb.	5.00 -
Grade B-25 lb.	4.75 -

Wires THAT
TELEGRAPH
A LOT OF Research
• Research? It's always going on at Lindsay—has been for more than 30 years—behind the scenes and "behind the seams." There's a Lindsay wire for every need—with sewed, brazed or welded seam—each type prescribed to meet your exact case and to help you make better paper at a lower cost.
THE LINDSAY WIRE WEAVING CO.
14025 ASPINWALL AVENUE
CLEVELAND, OHIO
Lindsay WIRES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WORLD'S LARGEST PRODUCER OF DRYER FELTS
ASTEN-HILL MFG. CO., PHILA., PA.
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Pacific Coast Representative
Walter S. Hodges, Portland, Oregon

MISCO "C"
THE CORROSION RESISTANT ALLOY
CAST • ROLLED • FABRICATED
for all equipment exposed to corrosion by sulphite acids
MICHIGAN STEEL CASTING CO., DETROIT, MICH.

STOCK PREPARATION EQUIPMENT
Dilts
MACHINE WORKS Inc. FULTON, N. Y.

WATERBURY FELTS
Are Made By
H. WATERBURY & SONS CO.
ORISKANY, NEW YORK

ENGLISH ECCO CLAYS TRADE MARK **CLAYS**
UNIFORM • SUPERIOR • DEPENDABLE
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551 Fifth Avenue, New York City

When You're Cramped for Space

USE THESE VERY LIGHT INCH SERIES BEARINGS

Write for the Catalog, which describes 108 distinct series of PRECISION Bearings, embracing over 3,000 catalogued sizes.

Having bores abnormally large, as compared with the outside diameter, they offer the engineer such important advantages as *compactness, light weight and greater latitude in design.*

They are available in the "S" and "XLS" ball bearing series, the former starting at ⅛-in. bore and the latter at 1⅜-in. bore, the complete range running up to 21-in. bore and 28-in. O. D. And there is the "RXLS" series extra light roller bearings, paralleling the "XLS" in size range.

Why not let our engineers tell you more about these Very Light Precision Bearings?

"NORMA-HOFFMANN"
PRECISION BEARINGS
BALL, ROLLER AND THRUST

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U.S.A.

MORRIS
CENTRIFUGAL PUMPS

Write for interesting and useful bulletin on Non-Clogging Pumps for handling pulp, and centrifugal pumps for other mill processes and services

MORRIS MACHINE WORKS, Baldwinsville, N. Y.

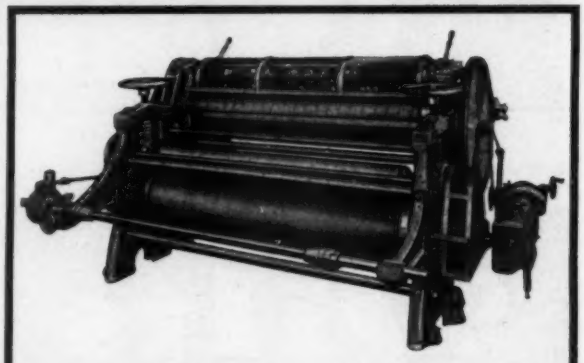
TRIMBEY MACHINE WORKS
GLENS FALLS, N. Y.

Knotters — Pulp Screens — Float Valves — Consistency Regulators —Weight Regulators—Color and Alum Meters—Metering Systems

DOES YOUR PLANT NEED ⟶ *TANKS · COOKERS · BINS CHUTES · SCREENS · DUCTS BREECHINGS · STACKS*

If it's made of sheet metal—Stainless Steel, Copper Clad, Nickel Clad, Monel Metal, etc., Littleford Bros. can make it. If you want it designed, or made to specifications, our 54 years' experience will assure you of perfect workmanship. Write today.

LITTLEFORD BROS. CINCINNATI, O.



Toilet Paper Embosser

The machine illustrated is our standard triple shaft toilet winder with embossing unit attached.

Winder may be operated with embosser disconnected if desired.

We also manufacture independent embossing units to be attached to your present winder units.

Hudson Sharp Machine Co.
Green Bay, Wisconsin

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American Engineering Co.
American National Red Cross 791
American Paper Machy. & Eng. Wks. 795
American Rolling Mill Co. 775, 785
Appleton Wire Works, Inc. 778
Appleton Woolen Mills 781
Asten-Hill Mfg. Co. 799
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